

December 1932

TECHNOLOGY REVIEW



technology review

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THE TABULAR VIEW

E

ONE of the outstanding events of the past few months, notes JOHN D. FITCH, '24, in a letter to the Editor, has been the unselfish manner in which engineers of this country have gotten behind the Reconstruction Finance Corporation for the sole purpose of expediting the affairs of that organization in order that work might be made available for many people throughout the coming winter. "What the public must be made to see is that while any self-liquidating loan for a water-supply or similar project necessarily implies employment of some engineering firm in connection with its design and construction, the real benefits accrue to the hundreds of men, from common laborer to skilled mechanic, who must be employed in its construction." As an Engineer Associate of the American Engineering Council in Washington Mr. Fitch writes from a point of vantage when he describes the activities of the American engineering profession in aiding reconstruction.

CL HUNTER ROUSE, '29, is an instructor in the Institute's Department of Civil Engineering and is, if we may use a somewhat dubious term, a hydraulician. This past summer he obtained his doctorate in Germany. According to Mr. Rouse, a number of German engineers originally opposed the construction of the huge large-scale laboratory at Obernach. Engels, one of the proponents of the project, once used the following story in an effort to convince some of his colleagues of the necessity of having something better than small-scale models: "Since the anatomy of the mouse and that of the horse are very similar, the workings of a horse's insides may well be assumed from a study of the mouse's, with a consequent saving of time, money, and horses. But if ever a horse gets sick, one will still prefer to go to a horse doctor rather than a mouse specialist." CL HARRY B. CHALMERS, '00, who contributes the article on streamlining to the Trend of Affairs Section, is President of the Jaray Streamline Corporation of America.

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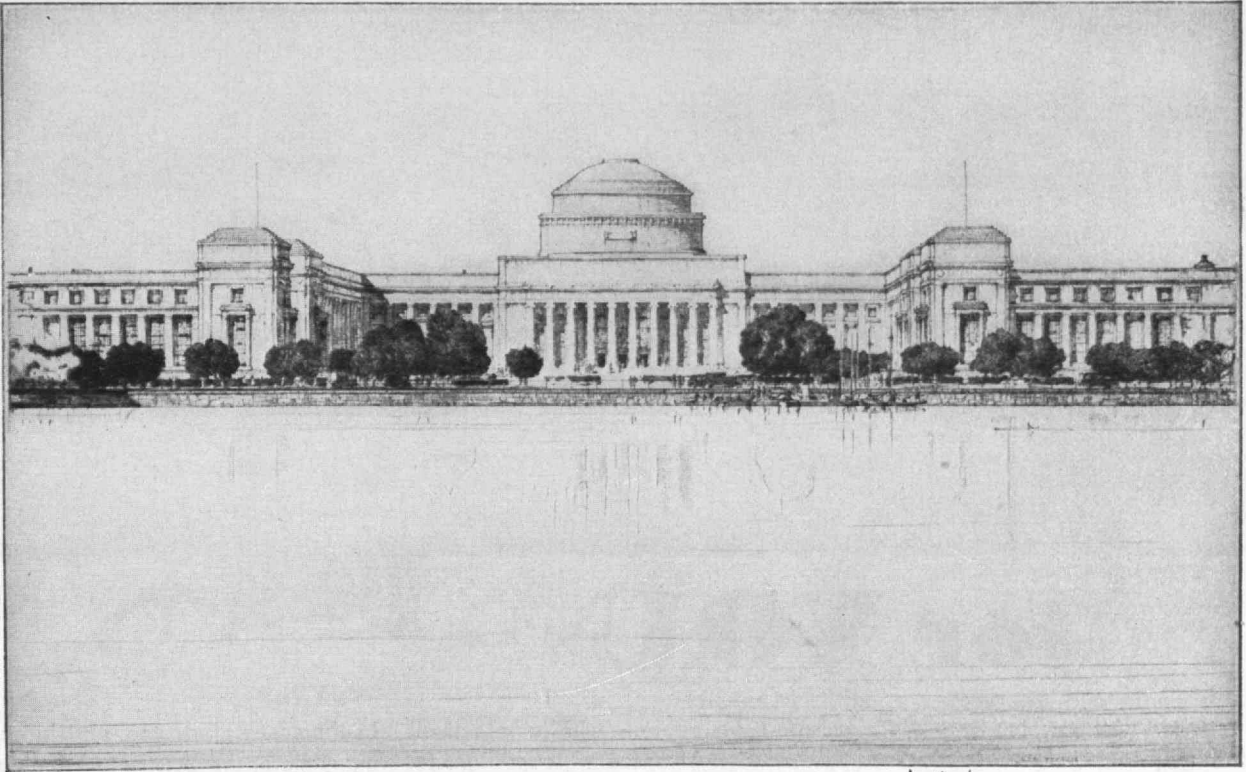


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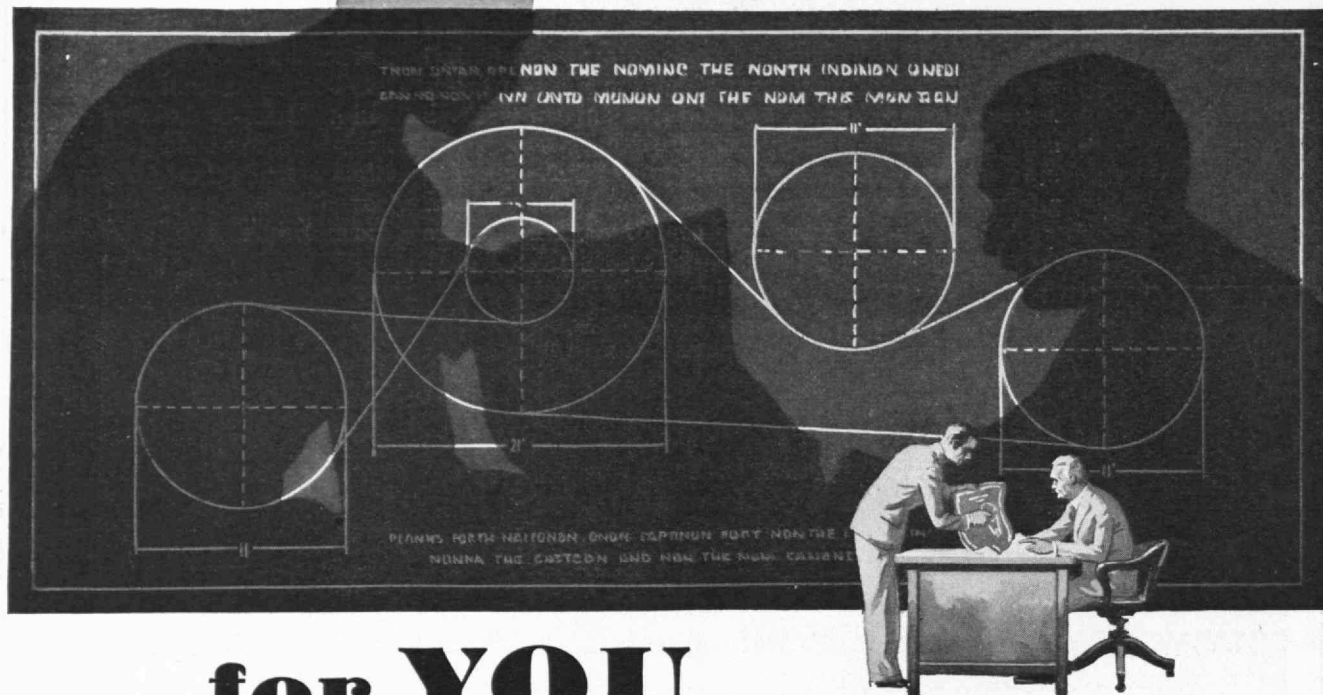
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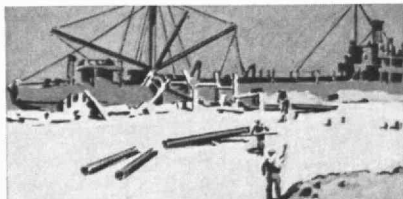
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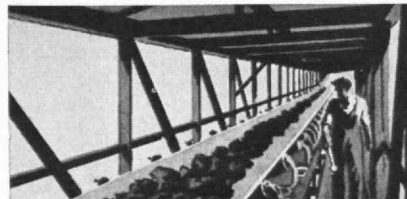
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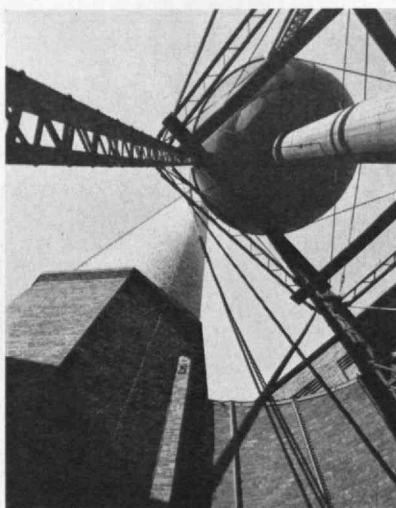


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A NATIONAL JOURNAL DEVOTED TO SCIENCE, ENGINEERING, AND THE PRACTICAL ARTS

Edited at the Massachusetts Institute of Technology

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Whittington

GRAVEL TRAINS IN BLACK CANYON

On November 13 the Colorado River was diverted into the 50-foot tunnels (see The Review for October) bored to detour the stream through a mile of solid rock while Hoover dam is being built. The dam required to divert the river is itself a huge structure, for it must stand for three years, the approximate time required to build the permanent dam

THE TECHNOLOGY REVIEW

Vol. 35, No. 3



December, 1932

Elbowroom for Industry

Why Are Concentrated Industries Steadily Dissolving?

BY HAROLD VINTON COES

FAR-REACHING changes are now taking place in American industry. These changes, just discernible in some instances, seem to indicate a trend toward a better balance between urban and rural population; the development of new raw materials for industry and new sources for existing materials from agriculture; the location of industrial plants in agricultural communities to permit of lower costs and greater economic security for the workers; the greater use of branch plants and branch assembly plants to afford access to, and to serve better, the domestic market; a limitation of the concentration of industrial units in the large cities and the dissolving of some of these concentrated units by scientific translocation to more suitable localities.

As the process goes on it should result in a better total economic balance, greater economic security, and more wholesome enjoyment of life by all. In bringing about and furthering these changes the engineer, guided by economic and scientific facts, principles, and laws, will be an important factor and will play a leading part. More than ever before the engineer must become economic-minded if he is to play his part well and serve society as it should be served.

During the early stages of the establishment and development of American industry, plants were located in small communities. The first instances of organized

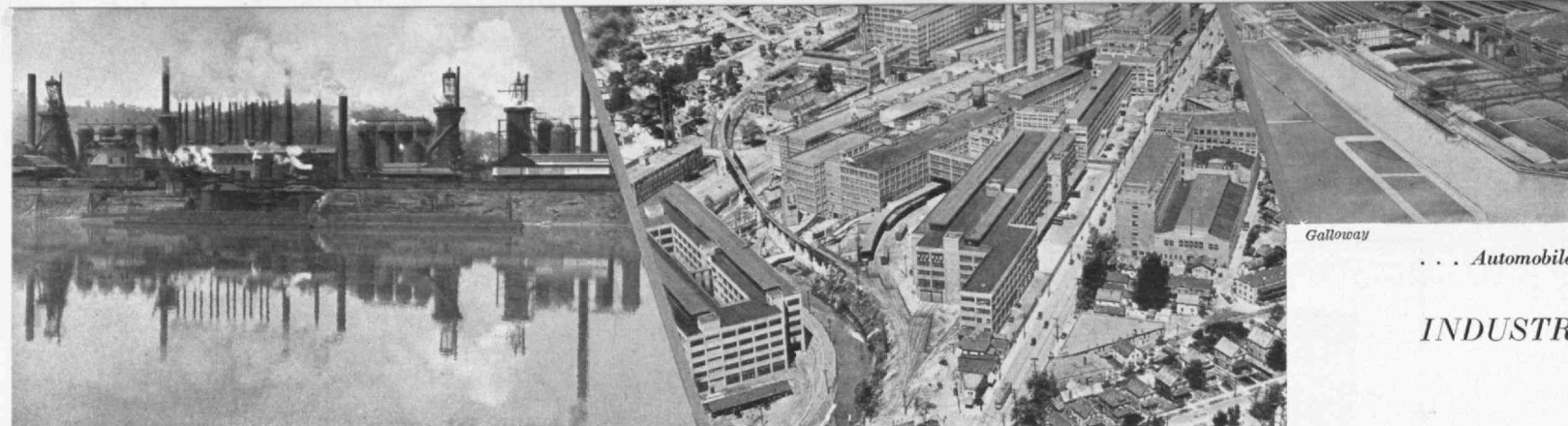
IS INDUSTRY FINALLY RECOILING FROM URBAN CONGESTION? AN ENGINEER PRODUCES EVIDENCE TO SHOW THAT IT IS, AND FURTHERMORE, THAT IT MUST — FOR EFFICIENCY'S SAKE AND FOR THE WELFARE OF LABOR

industrial activity on the American continent were the building of a ship by the Popham Colony in Maine in 1607 and of glass making at Jamestown, Virginia, in the same year. Neither of these industries developed or continued.¹ Industry was scattered; location was governed largely by the available water power.

While the development of the steam engine rendered partially independent of water power those industries in which power was an important element, it was not until the advent of electricity as a prime mover in the early 'Eighties that real concentration of industrial units began to take place. This was so even though steam and water power had brought about considerable concentration. Manufacturing then began to concentrate at those points where power generation and distribution were economical. This brought about concentration of labor, then labor specialization, until finally, when the auxiliary and service industries moved in, we had concentration of industry as we now know it in large cities.

In the beginning of industry in this country, the workers in the factories were mainly agriculturists. As industry became concentrated and specialized and labor more skilled and specialized the tendency was to drop the farms and leave that work to others (as hours were long), until we ultimately arrived at the condition now confronting us in the large cities where the workers are

¹ Holmes, "Plant Location," p. 151.



Steel concentrated in Pittsburgh . . .

. . . Tires and tubes in Akron

. . . Automobiles

INDUSTRIAL

absolutely dependent upon a pay check for existence. It is true that in some parts of New England and in the Mid-West the workers still maintain their own homes and gardens and are to a considerable degree self-supporting during the periods of extended layoffs. In these communities one does not see the distress that prevails in the big centers of industry during a period of business recession such as the one through which we are now passing.

We have seen meat packing concentrated in Chicago; women's clothing in New York; tires and tubes in Akron; shoes in Lynn and St. Louis; automobiles in Detroit; silk in Paterson; woolens in Lowell; cotton goods in New Bedford and Fall River; men's clothing in Rochester, Cleveland, New York, and Chicago; and steel in Pittsburgh, Chicago, and Birmingham.

The Forces at Work

The factors and economic forces that brought this about are too numerous for discussion in this paper. In broad terms they were availability of power, of raw materials, of skilled labor and craftsmanship, of markets, of transportation facilities, and of local capital. We are concerned here with the reverse of the process — dissolution of concentration. What is bringing this about? It seems to the author that two groups of forces are at work:

- (a) *Economic*
- (b) *Sociologic*

and heretofore the sociologic factors have been given relatively little attention. In the first group might be listed such factors as

- National rather than localized markets
- Electrical distribution
- Natural gas distribution
- Hard surface roads
- The automobile
- The airplane
- Communication lines
- Trucks
- Transportation costs
- Better rail service — store door delivery, container cars, etc.
- Time of delivery to markets
- Servicing
- Automatic machinery
- Wastes in distribution
- Higher rents and values of land
- Higher cost of operation in metropolitan areas
- Higher taxes in metropolitan areas
- Higher cost of labor

Higher costs of municipal government
Hazards of fire due to large concentrations.

In the second group, the factors are

- Uncomfortable and bad living conditions
- Health of wage earners
- Racketeering
- Municipal restrictions
- Instability of labor
- Hazards of plant operation interruptions due to concentration of large aggregations of labor
- Insecurity of labor.

The operation of these factors is bringing about a diffusion of manufacturing capacity. The table, "Present Distribution of Some Typical Industries," on page 86, indicates to some extent what is taking place.

The author had occasion, several years ago, to study scientifically the cost of production of insulated wire in a large metropolitan area as compared with producing it in smaller suitable urban communities and the total differential in cost of production and of distribution was about 25% in favor of the most suitable of the smaller communities. Furthermore, the living conditions for the wage earners and their economic security were greatly enhanced.

The factors permitting movement away from cities began to emerge about 1910, and the chief of these was economical power generation and distribution to points well outside the large population centers. Manufacturing plants no longer have to locate in the large centers to secure cheap and reliable power. The development of the electrical power and natural gas industries and of our railroad service, as well as our network of public highways, has given to industry a new mobility.

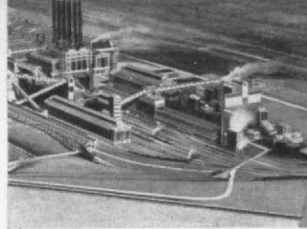
Comparison of Earnings of Large- and Small-Scale Industries

There is a popular impression that concentration is brought about by consolidation and merger, and that this is an economic necessity prerequisite to greater and more stable earnings. This impression is not supported by the facts.

In the early nineteen hundreds many prominent economists wrote of the "important positive advantages," as expressed by one of them,¹ due to large scale production. Another announced that "modern production tends to become concentrated."² It was not until a few years later that an economist expressed the idea

¹ Seager, "Introduction to Economics," p. 150.

² Bullock, "Introduction to the Study of Economics," p. 178.

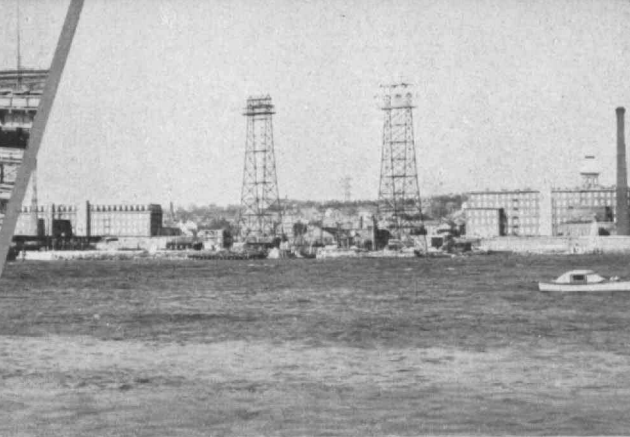


in Detroit

Galloway



... Meat packing in Chicago



... Cotton goods in Fall River

that the concentration of production facilities was not necessarily essential to successful consolidation. He stated that the industrial factory must be limited in size for maximum efficiency but that these limitations "applied with far greater force to a single local factory than to a federation of scattered plants. . . . The limits to the advantages of combination have been removed by the application of the federation plan."³

None of the writers ventured to suggest that there might be a point at which the law of diminishing returns would operate, a fact which would have a decided bearing on the limits of centralization and be a factor in the reverse process of dissolving concentration. The writers of that period, whether intentionally or otherwise, seemed to focus on the idea that size was the ultimate goal, the means to economic salvation; and it was inferred that there would be no place ultimately for the moderate-sized plant. Nothing, in the author's judgment, based on his observations and experience, can be wider of the truth. There are some products for some markets that lend themselves more readily to large scale production than others, the producing units of which (i.e., individual plants or factories) can be on a larger scale for more economical use of large and expensive equipment. This does not mean that the whole production must of necessity be concentrated in one yard or plant.

In a study of economic changes in the United States by the National Bureau of Economic Research, a table is presented showing by specified states the increase and decrease in manufacturing, as follows:⁴

Per Cent of Increase and Decrease in Manufacturing in Specified States, 1919-1925

Size-Group	NEW ENGLAND STATES		MIDDLE ATLANTIC STATES	
	No. of Estab-lishments	No. of Wage Earners	No. of Estab-lishments	No. of Wage Earners
Total	-11.7	-16.7	-17.5	-13.0
Over 250,000	-3.3	-12.6	-16.6	-15.5
250,000-100,000	-10.7	-20.0	-5.4	-16.8
100,000-25,000	-5.4	-18.2	-14.7	-13.6
25,000-10,000	-7.4	-15.1	-19.3	-7.6
Less than 10,000	-22.6	-14.8	-23.5	-9.2

Size-Group	INDIANA		MICHIGAN	
	No. of Estab-lishments	No. of Wage Earners	No. of Estab-lishments	No. of Wage Earners
Total	-19.9	+1.7	-17.6	+9.6
Over 250,000	-10.7	-16.3	-16.9	+3.5
250,000-100,000 . . . . .	....	....	-5.0	+8.5
100,000-25,000	-15.6	+5.0	-9.4	-0.2
25,000-10,000	-10.6	-6.7	-11.1	-15.5
Less than 10,000	-27.2	+15.0	-24.5	+44.0

³ Fetter, "Principles of Economics," p. 320.

⁴ "Recent Economic Changes," Volume II, p. 591.

Size-Group	NORTH CAROLINA		SOUTH CAROLINA	
	No. of Estab-lishments	No. of Wage Earners	No. of Estab-lishments	No. of Wage Earners
Total	-40.5	+17.1	-21.0	+27.2
Over 250,000 . . . . .	....	....	....	....
250,000-100,000 . . . . .	....	....	....	....
100,000-25,000	-1.8	+1.1	-34.7	-20.6
25,000-10,000	-10.7	+46.0	-24.0	+1.2
Less than 10,000	-47.2	+7.5	-17.7	+37.0

This study shows a marked decline in manufacturing and in number of establishments in the larger cities for the period reviewed, 1919 to 1925 inclusive, particularly for the so-called industrial states, and also a decided trend toward industrial growth in towns of less than 25,000 population and in agricultural states.

In commenting on the trend toward dissolving concentration, the author of the N. B. E. R. report makes these statements:

"It seems quite conceivable that the newer agriculture will tend to maintain a skeleton force on the land and transfer labor from town to country to meet seasonal requirements. . . . The easier way seems the shift of tractor men and practically unskilled harvest hands into the country during short periods of special needs with the same groups productively fitted into industrial callings of the town during agriculture's slack season. . . .

"All in all, it seems that the hard and fast line between agriculture and other industries and between rural and urban residence will tend to disappear. . . . A tendency is noticeable among some manufacturers to get their plants distributed in towns and villages adjacent to agricultural land. . . . It is impossible to show this approach of manufacturing toward the agricultural regions by statistical methods with as much clearness as could be desired. But it is apparent from the census of manufacturers over the last few years that a drift away from the highly industrialized centers in the Northeast and toward the smaller towns and villages in the central, southern and western states, has been under way. . . .

"That the rapprochement of city and country which appears to be under way in response to new conditions of auto transportation and to the organization of both farm and factory work, holds the possibilities for improved conditions on both sides. . . ."

Plant and Branch-Plant Relocations

In a cooperative survey by the Civic Development Committee of the National Electric Light Association and the Policy Holders Service Bureau of the Metropolitan Life Insurance Company, entitled "Industrial Development in the United States and Canada, 1926 and 1927," 1,934 communities in the United States were studied, the survey indicated that over 10,000 plants and 371,000 workers were gained in that period by the reporting communities. Plant relocations

accounted for 9.4% of the plants and 18.7% of the employees. New industries accounted for 81.8% of the plants and 56.3% of the employees gained, while branch plants were responsible for the remainder of 8.8% of the plants and 25% of the employees. The average size of plants gained for the country as a whole was 36 employees. The average relocated industry had 71 employees and the average branch plant had 103 employees. The average new local industry had 25 employees.

The survey shows the extent to which smaller cities have gained through establishment of branches and relocations within their borders. Of all gains made by these cities, those under 10,000 in population received 26.2% of all branches reported in the survey and 17.9%. This shows the principle of decentralization at work.

The use of branch plants as a means for industrial expansion and dissolving of concentration is a comparatively recent development and is primarily the direct result of the operation of economic forces, particularly in the field of marketing and service.

There is evidently a trend toward more equal distribution of manufacturing in many industries throughout the country.

Some light can be shed on the dissolving of concentration in large cities by studying the shift of wage earners between cities and urban localities, as discussed in "Re-

cent Economic Changes": "Between 1919 and 1925 while the 25 largest cities in the country lost 326,800 wage earners, about 12% of the average number employed, the rural area (all area not included in communities having a population of 10,000 inhabitants) gained 55,204 wage earners. Nor is this decrease limited to the larger cities. Cities between 100,000 and 250,000 population lost even more heavily, 14% of their wage earners; communities between 25,000 and 100,000 lost 11%, and those between 10,000 and 25,000 lost 8% of their wage earners."¹

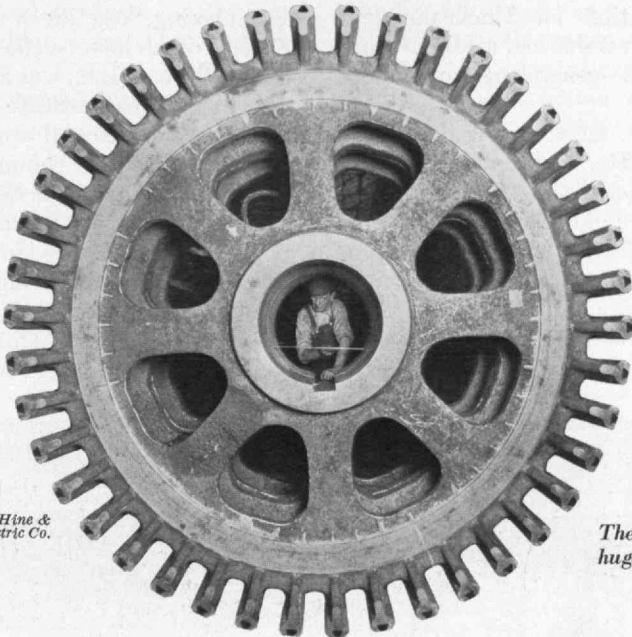
The report of the Committee on Industrial Decentralization and Housing of President Hoover's Conference on Home Building and Home Ownership presents figures showing, for the past two decades (1910 to 1930), the increase in percentage of population and of wage earners in manufacturing residing in communities of varying sizes as shown in Table A (see page 107).

Several interesting developments have taken place in this period. The concentration rate for large cities (1,000,000 or larger) more than doubled; cities of 500,000 to 1,000,000 showed a decline in population of from 107 to -7%; cities with 250,000 to 500,000, on the other hand, showed a growth five times as great, while those with 100,000 to 250,000 showed a rate about half of that for the pre- (Continued on page 107)

¹ "Recent Economic Changes," Volume 1, p. 210.

PRESENT DISTRIBUTION OF SOME TYPICAL INDUSTRIES

Industry	No. of States Containing Most Plants	States in which Most Plants Are Located	No. of States with Greatest Concentration	States with Greatest Concentration	State with Largest Percentage of Total Capacity
Wood Pulp and Paper...	19	Me. N.H. Vt. Mass. Conn. N.Y. Pa. N.J. Md. Va. Ohio, Mich. Ind. Ill. Wis. La. Minn. Wash. Cal.	5	Me. Mass. N.Y. Mich. Wis.	N.Y.
Pig Iron.....	8	N.Y. Pa. W.Va. O. Mich. Ind. Ill. Ala.	4	Pa. O. Ind. Ill.	Pa.
Glass.....	10	N.Y. Pa. N.J. O. Md. W.Va. Ind. Ill. Okla. Cal.	4	Pa. W.Va. O. Ind.	Pa.
Pottery.....	10	Mass. N.Y. N.J. Pa. W.Va. O. Mich. Ind. Ill. Cal.	2	N.J. O.	Ohio
Furniture.....	16	Mass. N.Y. Pa. N.J. Md. Va. N.C. Tenn. Ky. O. Mich. Ind. Ill. Mo. Wis. Cal.	3	N.Y. Mich. Ill.	N.Y.
Petroleum Refining.....	12	Mass. N.Y. N.J. Pa. O. Ill. Okla. La. Kan. Tex. Wyo. Cal.	3	N.J. Tex. Cal.	Tex.
Canning.....	17	Me. N.Y. N.J. Md. Pa. O. Ind. Mich. Ill. Wis. Mo. Ia. Minn. Utah, Wash. Ore. Cal.	3	N.Y. N.J. Cal.	Cal.
Dairy Products.....	19	N.Y. Pa. O. Mich. Ind. Wis. Ill. Minn. Ia. Mo. Kan. Neb. S.D. N.D. Col. Id. Wash. Ore. Cal.	2	Wis. Minn.	Wis.
Cane Sugar.....	9	Mass. N.Y. N.J. Pa. Md. Ga. La. Tex. Cal.	2	N.Y. La.	N.Y.
Beet Sugar.....	14	O. Mich. Ind. Ill. Wis. Minn. Ia. Neb. Kan. Col. Wyo. Id. Utah, Cal.	3	Mich. Col. Utah	Utah
Salt.....	7	N.Y. O. Mich. Wis. La. Kan. Cal.	2	N.Y. Mich.	N.Y.
Soap.....	9	Mass. Conn. N.Y. Pa. N.J. O. Ind. Ill. Cal.	3	N.J. N.Y. O.	N.J.
Varnish and Paint.....	12	Mass. N.Y. N.J. Pa. O. Mich. Ind. Ill. Wis. Mo. Ky. Cal.	5	N.Y. N.J. Ill. Pa. O.	N.Y.
Cocoa and Chocolate....	7	Mass. N.Y. Pa. N.J. Ill. Wis. Cal.	3	Pa. N.Y. Mass.	Pa.
Confectionery.....	18	Mass. N.Y. N.J. Md. Pa. Va. O. Ind. Mich. Wis. Ill. Ind. Tenn. Ga. Mo. Ia. Minn. Cal.	4	N.Y. Mass. Pa. Ill.	N.Y.
Cement.....	27	N.Y. N.J. Pa. Md. Va. W.Va. Tenn. Ga. Ala. O. Mich. Ind. Wis. Ill. Mo. Ia. Ala. Tex. Kan. Neb. S.D. Col. Mont. Utah, Wash. Ore. Cal.	5	Pa. N.Y. Mich. Ala. Cal.	Pa.



Lewis Hine &
General Electric Co.

The rotor spider of a
huge induction motor

Depression Hath Her Victories

How Engineers Are Helping the Nation and Aiding Themselves

BY JOHN D. FITCH

THAT engineers have not taken the blows of the depression supinely goes without saying. But what have they done as a profession to break the blows, not only in defense of themselves but in defense of the whole country? How has the profession succored its own disabled members in local areas and what contribution has it made to national reconstruction? It is my purpose to answer these questions by describing (1) two typical relief programs in local areas and (2) the work of the American Engineering Council in Washington.

As a general rule, the greater amount of engineering unemployment with its resulting suffering has been found in the larger cities, particularly New York, Boston, Chicago, and the industrial centers, such as Pittsburgh and Cleveland. Engineering activities have been concentrated in these cities for many years, and the reduced volume of business caused by the depression found many of these engineers with their income cut off and with no place to turn for help. To meet this serious situation the local sections of the national engineering societies, together with engineering societies located in the cities affected, have formed relief organizations to help members of their professions. To describe all the wonderful work which has been accomplished is impossible, but it may be of interest to review the activities of two of the typical outstanding relief organizations,

MEETING ADVERSITY SQUARELY,
THE ENGINEERING PROFESSION
HAS INCREASED EMPLOYMENT,
AIDED NATIONAL RECONSTRUCTION,
AND MADE PERMANENT
CONTRIBUTIONS TO PUBLIC
WELFARE

the Professional Engineers' Committee on Unemployment (New York), and the Emergency Planning and Research Bureau, Inc. (Boston).

To meet the situation in the New York metropolitan area which for this purpose has been defined as that area within a 50 mile radius of New York City, the four Founder Engi-

neering Societies organized in October, 1931, the Professional Engineers' Committee on Unemployment. This general committee consists of 40 representatives of the four participating societies. Due to the magnitude of the problem a very complete organization was required and some dozen subcommittees were set up whose work has been coördinated by an executive committee of six members.

Two policies were definitely adopted at the beginning of the movement: that the P. E. C. U. in affording relief would make no distinction between members and non-members of the four Founder Societies; and that all monies collected for relief would be applied to relief purposes only — the necessary administrative funds to be obtained from other sources.

To be successful, any local efforts directed toward relief of unemployment must be coördinated with other similar movements in the locality. Therefore, one of the first steps of the P. E. C. U. was that of making contact with the regularly established relief organization, Emergency Work Bureau II, which was the New York branch

of the President's Organization for Unemployment Relief and which had already established a Made-Work Bureau in connection with the general unemployment relief program in that city.

The American Engineering Council arranged with the Professional Engineers Committee on Unemployment to have that organization function as the Council's New York Committee on Engineers and Employment. This arrangement eliminated duplication of effort and provided liaison by which the local organization was tied in with national efforts.

Several types of relief have been provided by the P. E. C. U. The work of the organization itself required

Engineering Societies of Boston, Inc., and the Boston Society of Architects, the Emergency Planning and Research Bureau, Inc., was formed last October for the purpose of assisting destitute engineers and architects in the metropolitan area of Boston. The organization consists of a central executive committee and a staff of directors. Sub-committees have been formed for handling the various phases of the work.

The method followed in providing work by this organization is very interesting. A typical engineering office has been set up employing engineers in the capacity of draftsmen, designers, squad bosses, and so on. A standard scale of wage is paid to the men employed — \$15 for



Cushing

Section of the new three-mile high-level viaduct (longest in the world) across the Jersey meadows and the Hackensack and Passaic Rivers. See opposite

the establishment of a fairly large staff and this personnel was composed of engineers in need of relief who were paid a nominal weekly wage. Through contact with the Gibson Emergency Work Bureau Committee and the Bliss Commission Work Bureau Committee, together with other county relief organizations, a large number of men were placed on emergency work.

Arrangements were made with the Geological Survey for a Federal appropriation under the Temple Act to match a similar appropriation from the State of New York for topographic survey work which provided employment for a considerable number of engineers.

Up to May 14, 1932, the organization had registered 2,163 men actually in need of help. Of this number, it had succeeded in placing 1,389 men. In addition to employment relief work, the committee has been active in alleviating actual suffering and destitution. This has been done largely through non-interest bearing loans which up till May 14, 1932, had totaled \$3,355. These loans are made only in cases of dire necessity where starvation threatens or medical service is required.

In addition to the actual loaning of money, the committee has been able to provide a great deal of aid through intervention with landlords, mortgage holders, light and gas companies, and so on, by persuading these individuals or companies to extend further credit to engineers who are temporarily unable to meet their obligations. The Engineering Women's Group of New York has also done an excellent service in providing clothing for needy engineers and their families.

The situation in Boston has been met by an organization similar to P. E. C. U. Under the auspices of the

draftsmen, \$25 for chief draftsmen, for a five-day week. This engineering office executes work of an engineering nature which has been secured through coöperation with city, state, and other bodies. Examples of the work done are of interest. The office worked with architects on mapping of city-owned property and the blocking of the 1930 census, housing studies in south and west districts of Boston, depreciation studies of downtown business sections, and correction of maps for street changes for the Boston Planning Board; planning studies for the town of Weymouth; surveys in connection with public reservations; plotting of statistical data supplied by certain state departments; work with the Engineering Economics Foundation; mapping of water works distributing systems under the sponsorship of the Associated Factory Mutual Fire Insurance Companies; work with the Assessors' Department of the City of Boston; smoke investigations in the vicinity of Boston; work under the direction of the Massachusetts Special Commission on Stabilization of Employment; research work in connection with the Engineering Societies of Boston; and soil studies at M. I. T.

As in New York, one of the first steps of the Boston organization was to establish contact with the United Boston Unemployment Relief campaign so that its activities would parallel rather than combat the activities of other bodies. The organization also provides for liaison with the American Engineering Council through Colonel Frank M. Gunby (member A. S. C. E.) who is chairman of both the Executive Committee of the local organization and the Council's Massachusetts Committee on Engineers and Employment.

While the two above organizations have been somewhat fully described, it should not be inferred that they are the only ones worthy of mention. They have merely been selected because they offer excellent examples of how unemployment among engineers in the larger cities has been relieved. Throughout the entire country, wherever local engineering organizations are in existence, similar programs have been put in effect. The extent of activity has varied only with the variation in local needs.

In addition to the direct relief of unemployment and suffering among engineers, the local organizations have pursued another activity which is of equal importance;

that the efforts of the Council should be concentrated on the national aspects of the problem, leaving local problems to local organizations.

With this viewpoint in mind, the Council early mapped out and has diligently pursued a program designed not only to assist in the emergency of the hour but further to provide for an improvement of the economic status of the engineer in the future. No sharp line of demarcation can be drawn between these two phases. Measures designed to maintain employment during a depression likewise apply in periods of good business. The converse of this is also true. Consequently, anything achieved is likely to be a permanent gain.



View of the Jersey viaduct as it crosses the Hackensack River. The viaduct forms a final link in the new Lincoln highway route to the Holland Tunnels. See page 93

Cushing

that of assisting in the revival of business activity. It has been generally recognized that any such revival must include the help and service of the engineer. To this end the local engineering bodies have unceasingly endeavored to promote needed projects and to stimulate industrial rehabilitation. Their services to this end have been invaluable, for while such a movement must naturally be headed up by national supervision and coördination, the actual work must in most cases be performed by the men on the ground. Before leaving the local fronts, it is interesting to note that prominent engineering schools have offered free courses of full college grade to their unemployed alumni. At M. I. T. and Columbia such courses have been notably successful.

AND now, having outlined the battle campaign on local fronts, I should like to sketch the national campaign which the engineering profession has been waging, not only for its own benefit, but to promote movements tending to a return of prosperity for all of our people. As the apex of organized American engineering, the American Engineering Council stands as the official representative of 27 engineering societies having a constituent membership of approximately 62,000 engineers. Its objective is to further the public welfare wherever technical and engineering knowledge and experience are involved and to consider and act upon matters of common concern to the engineering and allied technical professions. The very nature and purpose of the organization clearly imposed upon it an obligation to assist in every possible way to relieve the conditions incident to this critical period. It was also very evident

The program of the Council has been prosecuted along four major lines, as follows:

1. Encouraging or assisting in the passage of Federal legislation, of an engineering nature, designed to provide relief and hasten recovery
2. Coöperation with Federal agencies to the end that the possibilities of the enacted relief measures might be utilized to the fullest advantage
3. Coöperation with other national organizations engaged in relief work, both governmental and voluntary
4. Coördination of all of the above, together with local problems, through the establishment of official committees in the several states.

Each of the foregoing activities will be discussed in order that some conception may be obtained of what has been done.

The second session of the 71st Congress convened on December 2, 1929. This date may be accepted as the starting point for all measures, public and private, to maintain employment or to relieve unemployment. It was at this time that the engineering profession began active participation in securing national legislation designed to maintain employment or relieve unemployment. One of the expressions of this was the effort made to secure increased appropriations for the engineering services of the Federal Government. This effort was quite successful as these appropriations were materially increased for the fiscal years 1930-1931 and 1931-1932. The effect of this upon the employment of engineers is evidenced by the fact that during a two-year period the number of engineers employed (*Continued on page 104*)



Northern end of the Experiment Station. In the distance a range of the Tyrolean Alps can be seen, and in the foreground is the bed of the Obernach River. Practically the entire tract owned by the Research Institute for Water Power and Hydraulic Engineering is visible

NOT at all surprising is the fact that it was Oskar von Miller of Munich who first conceived the idea for an outdoor hydraulic experiment station in the foothills of the Bavarian Alps. He had already developed the Deutsches Museum into an object of international wonder, and united the power plants of Bavaria into a system known as the most perfect electrically of any on the globe. And he has now sponsored this latest endeavor so successfully that it has been recognized as the greatest open-air laboratory for hydraulic engineering in the world.

Despite Germany's previous success with small-scale experiments, there are still engineers who look with doubt upon the results of tests on models reduced a hundred-fold from natural proportions and often not even geometrically similar. A theory of hydraulic similitude is logical enough in its way, but without actual proof of the dependability of its conversion factors, not all will accept it unconditionally. Furthermore, there are experiments whose very nature prohibits scale reduction, yet which are vitally essential to industry and engineering.

Because of this need for large-scale tests, the Research Institute for Water Power and Hydraulic Engineering was formed in 1926 as a department of the Kaiser Wilhelm Society for the Promotion of Science. It was made a practically independent unit, financed by the national, Bavarian, and Munich governments, together with a number of private concerns interested in furthering the science.

After a careful search for a site fulfilling the qualifications of land, water supply, and proximity to Munich, the Board decided upon the valley south of the Walchensee, a mountain lake of Bavaria, where all three requirements were met to a high degree. At this point the diversion canal of the Isar River joins the Obernach, a stream emptying into the Walchensee, and provides the principal supply for the power plant at the lower end of the lake. The actual station grounds include an elongated area of some 25 acres, bounded on either side by

Night Watch

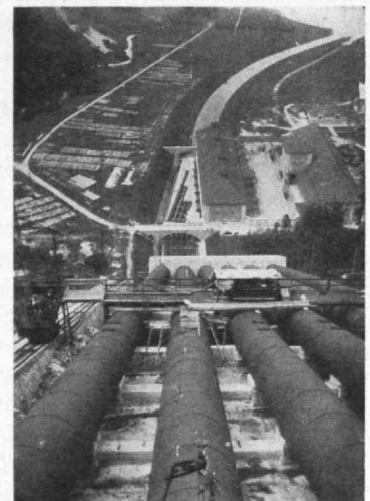
"The World's Largest Open-Air

BY HUNTER

the Obernach and the Mittenwald-Munich state highway. Thus the station has at its disposal ample space in a locality abounding in actual hydraulic developments, together with a steady water from which it may draw without charge as much as 425 second feet.

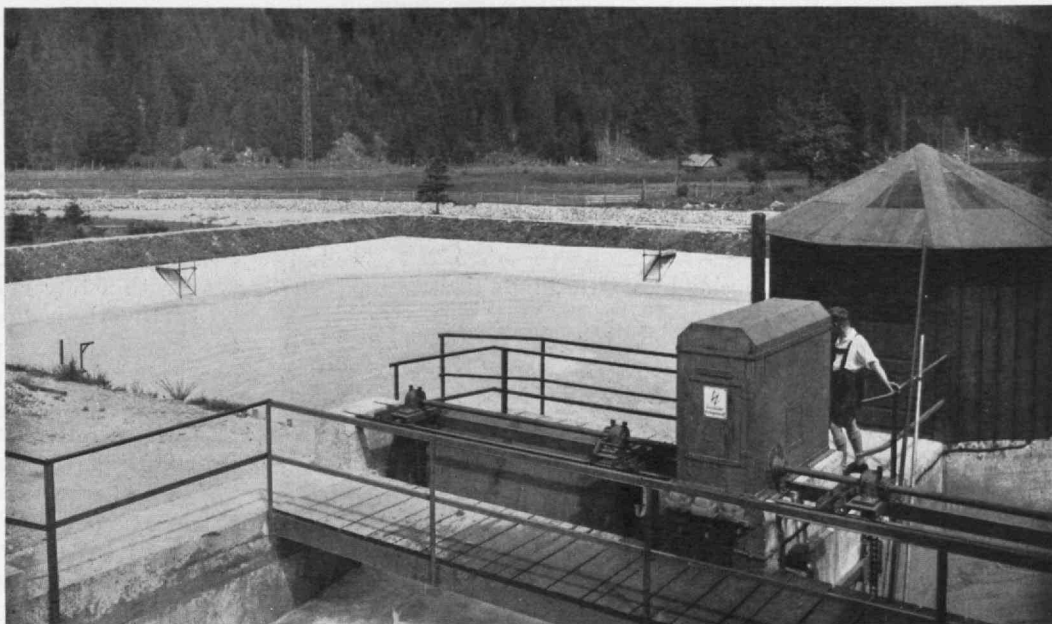
When I first visited this experimental paradise in the autumn of 1929, the plant was already in such a healthy state of development that I returned for three months the following summer. By then the initial installations had been completed and rated, with the opening series of experiments well under way. These involved a rigid comparative test of the four standard European and American methods of discharge measurement (weir, current-meter, salt-dilution, and salt-velocity), and the equipment was planned for these runs, yet made easily adaptable to future demands.

At the southern end of the station is a permanent distrib-



The nearby Walchensee Power Plant where important tests have been made

View over forebasin toward measuring basin during filling. At the right is the gate mechanism; vertical rods are hand controls to divert seepage from under gates into discharge; beyond is the gage house. The basin in off hours makes an excellent swimming tank for the experimenters



at Obernach

Hydraulic Experiment Station"

ROUSE

uting basin holding 88,250 cubic feet of water, of sufficient size to serve as many as four or five separate outlets to individual experiments; water is drawn from the Isar canal, and the surface level kept constant by a 30-foot spill weir wasting into the Obernach. From this basin leads a main canal about 1,900 feet in length and divided into four sections of varying pattern; the last of these sections of the experimental canal is rectangular and of concrete for the more important experiments.

At the end of the concrete flume (about 8.2 x 6.6 feet in cross section for a peak flow of 141 second feet) is located the large concrete measuring basin, for the actual volumetric check upon discharge through the flume. The care taken in calibrating this basin is typical of the thoroughness of the station methods; the entire structure was measured by tape and transit and the volume-depth relation calculated geometri-

cally; as a further check, the same function was tabulated by weighing successively volumes of water and introducing them into the basin, reading the gages in the basin pit after each addition; later the capacity was even measured photographically, by a method similar to aerial mapping. Thus the basin has been calibrated to its maximum capacity of 52,000 cubic feet with an exactitude that allows a total error in discharge measurement of $\pm 0.1\%$.

With this measuring basin as the key of the station's research accuracy, other experiments may be based either upon direct use of the basin or upon measurement by instruments which have already been so rated. Thus all experiments — whether in the permanent concrete channel or at any point in the area devoted to temporary model set-ups — may have a conclusive volumetric check.

A staff of eight or ten engineers is on duty throughout the summer months when active experimentation is in progress, a major run requiring the assistance of all, since the size of the layout necessitates constant attention at numerous points over a large area. A telephone system to all points keeps the staff members in close touch with each other during the run. The station has its own metal-working shop, where much of the apparatus is constructed, together with space for drafting and chemical analysis; in the headquarters cabin are living accommodations for the several men who are in permanent residence.

Delicate measuring instruments and clever error-trapping schemes all too numerous to describe are typical features of this unique outdoor laboratory; special tests for seepage through the concrete flume and basin walls; injection tanks providing constant discharge over great length of time; electric water gages; chronometers giving permanent ink records of experimental data and sending the same one-second impulses electrically to all parts of the station; and added to this a corps of men who have been with the Research Institute since the days when they were first putting the plans to paper.



Measuring the discharge of a mountain stream by the salt-dilution method

LONG will the memory of my first night watch with one of these assistants remain fresh in my mind. A ridge of the Tyrolean Alps was visible toward the south, but the night was black with the shadows of nearby pines. From the west came the dull roar of the Obernach rapids, while the sound of a steady downpour just beside the door of the little control house marked the lower end of the gray stretch of experimental canal fading into the darkness.

Monotonously ticklish business this, reading a dozen



depth gages at hourly intervals throughout the night; only a donning of headphones to note the buzz of contact when the gage point touched the surface, but — a meter of chilly mountain water below one's feet, hobnails catching on the tiniest irregularities of the concrete brink, and drowsiness playing tricks with one's eyelids. Yet when a run still lacks twenty-odd hours till completion, night is of little consequence. Rain — that surprisingly frequent and unforetellable factor of Upper-Bavarian summers — was the only matter of sufficient import to vary the routine of the station. With the advent of a shower, a run was immediately discontinued; but night meant only a change of shift, and pine shadows on Alpine foothills.

With the depth gages tabulated for another hour, I joined my comrade in his search for the elusive ground-water standpipes. Of very little concern, to be sure, when the water to be measured is flowing in a concrete flume — and of particularly little concern when one is sleepy and cold. But who knows — perhaps a fraction of one percent closer to the ultimately accurate if seepage losses are not ignored, and the station prides itself on excluding error; even a negative answer is better than none at all.

At midnight we pulled the levers that sent the discharge tumbling for several minutes into the large basin just behind the control house, where a chronometer recorded the exact instant of arrival and departure of the twin Tainter gates at their sills. The basin full and

the record dated and filed, we wheeled through the darkness a half mile to the cabin at the head gates of the canal to sup on beer and sausage and hardy gray bread, awaiting the quieting down of the rhythmic sway of the water in the measuring basin.

Beer is beer, and waves in such a basin do not exhaust themselves in five minutes — but perhaps at one o'clock I began my vigil over the basin gages, deep in a covered well at the side. Vigil? — and what a one! A glass standpipe before me, with a tiny light and mirror to facilitate noting the instant the knife-edge caught the water surface; a long sheet of graph paper on which I plotted the readings to $\frac{1}{20}$ of a millimeter against one-minute intervals of time of night; and an envelope of Austrian cigarettes that made me curse the tax that had sent common American varieties to \$2 a pack.

This meant some hundred or more readings of water depth for only one filling of the

Left: Reading water elevation electrically in concrete section of experimental canal. The vertical pipes are the electrodes for the Allen salt-velocity method. Below: Bavarian laborers constructing model of Elbe River for Engels' large-scale experiments



measuring basin; again an apparent exaggeration of necessary care. But such pains are more comprehensible when one follows the waves in the graph — a breeze, and the water in the basin begins to sway again with accompanying variations in the readings; and only by a long watch at the gages may one accumulate enough data for a satisfactory average. Completely justifiable is this care when one realizes that the entire success of the run depends upon the volumetric records of this basin.

Still other night shifts with a book of logs and Rehbock's long weir formula before me, roughly checking the accuracy of the run before conditions changed; days by burettes and evaporating dishes analyzing samples of discharge into which (*Concluded on page 110*)

THE TREND OF AFFAIRS

IN THIS SECTION: *Recent Engineering Feats* (93); *The Multiplying Applications of Ethylene Derivatives* (93); *How Light May Be Used to Measure Great Distances* (94); *TNT's Dependable Nature* (95); *New Uses for Cotton and Cotton Products* (96); *Air Penetrability of Automobiles* (97)

Records (Cont'd)

AMONG autumn's principal engineering achievements in the way of record breaking are to be noted three at sea, four in the air, two in the field of power production and control, and four in materials moving.

AT SEA. A speed of 42.85 knots in her trial run by the French destroyer *Cassard* breaking the previous 42-knot world record of the French destroyer *Gerfaut*. . . . London to Bombay in 16 days, one hour, and 42 minutes by the P. & O. liner, *Viceroy of India*, nearly two days better than the previous fastest time made by the *China* in 1919. . . . Launching of the *Normandie* at St. Nazaire. World's largest ship to date: 75,000 tons, 1,020 feet long with a beam of 117 feet, and carrying capacity 2,132.

IN THE AIR. Recognition by *Fédération Aéronautique Internationale* that C. F. Unwin in a Vickers Vespa biplane had reached a height of 13,404 meters, or 43,976 feet, compared with the existing record of 43,100 feet set up in the United States. . . . Roscoe Turner, breaking the transcontinental speed record by two hours and 17 minutes, on November 14, flew from the Atlantic to the Pacific Coast in 12 hours and 33 minutes. . . . In November Transcontinental & Western Air, Inc., began a new schedule which makes possible a regular travel service from Boston to Los Angeles in 31 hours and 38 minutes elapsed time. This is 7 hours and 12 minutes faster than previous existing schedules. . . . Non-rigid airship *TC-13*, largest of its type, now building at Akron by Goodyear-Zeppelin Corporation, where completion of the *Macon* is also being pushed. *TC-13's* passengers will ride in a car streamlined into the inside envelope and suspended from inside cables, but may be lowered in an observation car by means of a 1,000-foot cable while *TC-13* is hidden above the clouds.

POWER PRODUCTION AND CONTROL. The world's most powerful Diesel engine is now being built

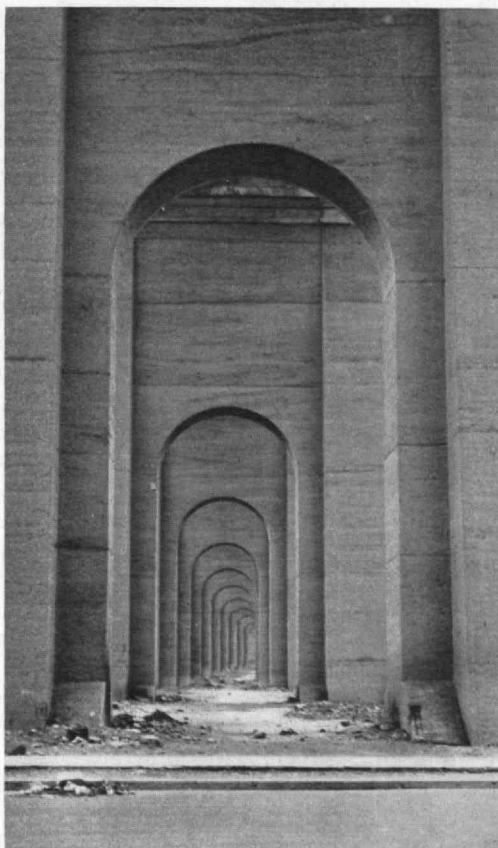
in Copenhagen for installation in a power plant in that city. It will have a normal output of 21,000 b.h.p. and a maximum output of 22,500 b.h.p. . . . A vacuum tube, declared the most sensitive measuring device of all time, which will respond to an electric current of one-quintillionth (1-1,000,000,000,000,000) of an ampere. General Electric's claim is that the tube will also measure the flow of six electrons per second and "if these are considered as that many drops of water, then the number of electrons flowing in one minute through the usual 50-watt incandescent lamp equals the number of drops in the enormous volume of water going over Niagara Falls in a whole century."

MATERIALS MOVING. 18,378,600 cubic yards of earthwork placed in Mississippi River flood control levees during September, a record month. . . . To be added to all other record-breakings on Hoover Dam is that of the largest capacity cableway ever built: 1,200 feet in length, spanning the canyon and capable of handling 150 tons. . . . Three-mile high-level viaduct,

longest in the world, across the Jersey meadows and the Hackensack and Passaic rivers. The section is the final link in the 13 miles of roadway between the Holland Tunnels and Elizabeth, and is free of street intersections and railroad grade crossings throughout its length (see pages 88 and 89). . . . A \$300,000 electrically operated Marion steam-shovel for Clemens Coal Company's strip mine fields near Pittsburgh, Kan. Each scoop of the dipper removes 486 cubic feet, or 27 tons of earth. The operator can shift excavated material 200 feet and drop it on top of a seven-story building, if he desires.

Ethylene in Industry

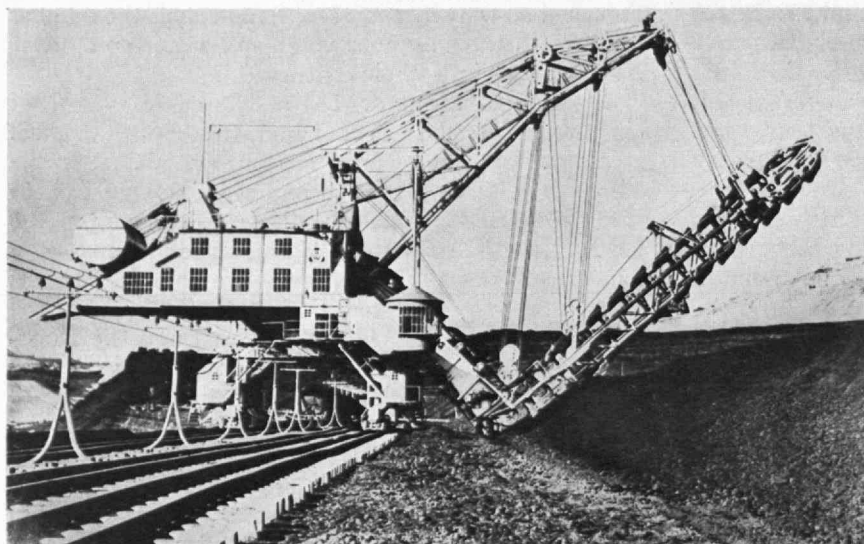
ORGANIC chemists — those who work with carbon compounds — have been compared to artists. Their mediums are atoms and molecules instead of pigments or stone, and by the marvelous power of synthesis they create compounds with an "innate warmth of concept and



Charles Phelps Cushing
Marching arches in Queens. The Long Island approach to Hell Gate Bridge

beauty of line for him who truly understands." Out of such unpromising material as coal tar, they have created hundreds of thousands of new compounds, few of which occur in the natural world but many of which are now practically indispensable to man. As our Contributing Editor, Professor Tenney L. Davis, '13, said in this section last April, "There truly seems to be no limit to the variety of organic substances which may be synthesized now or in the future from the elements or from simple, cheap, and abundant materials."

The truth of this was amply demonstrated in a paper recently presented before the Northeastern Section of the American Chemical Society by Dr. J. G. Davidson, Vice-President of the Carbide and Chemicals Corporation. Dr. Davidson dealt only with the derivatives of ethylene — a small sector of organic chemistry's vast domain — but his paper covered a whole new series of compounds which are of growing importance to industry and medicine. Here are some of these aliphatic compounds and a few of their uses:



Keystone

A giant shovel running on rails and huge enough to straddle a pair of railway tracks on which cars can be run for filling. It is installed at the Michel Legnite Coal Mine, near Halle, Germany

1. *Ethylene*, mixed with a little nitrous oxide or oxygen, is an excellent anæsthetic, producing less nausea and after-effects than ether. It is also used (one part in 10,000) to turn oranges a golden yellow, and it is similarly used to hasten the life processes of other fruits and vegetables, notably bananas.

2. *Ethylene Chlorhydrin* is used to speed up the life processes of fruits and vegetables, at their beginning instead of at their end. Thus, it is used to make potatoes sprout immediately after harvesting.

3. *Ethylene Oxide* is an excellent fumigant for certain insect pests. In combination with carbon dioxide it is used for treating stored grain, and when properly applied it is 100% effective against the grain weevil. Its use in elevator bins involves no fire hazard, no harmful effects upon the milling and baking qualities of the grain, and no danger to the operator. Its use in the protection of furs is replacing the common cold-storage method.

4. *Ethylene Glycol*. This compound is generally familiar because of its use as an anti-freeze in automobile radiators. In this capacity it does not boil away. It lowers the freezing point more than an equal volume of oil or glycerol, and it is not so viscous as glycerol solutions at low temperatures and high concentration. It is also used in the manufacture of low-freezing dynamites and as a constituent of electrolytic condensers for radios.

5. *Diethylene Glycol* is used in the manufacture of composition cork and by textile workers for "wetting out," making dyes penetrate, and softening fabrics.

6. *Triethanolamine* can be nitrated to yield an explosive and with oleic acid to form a soap soluble both in water and gasoline. It is also extensively used as an emulsifying agent in the textile, leather, and cosmetic industries. It is further used to fix colors on cloth, as a lubricant in spinning, and to increase the rate of penetration of creosote into hard wood.

7. *Methyl Cellosolve* serves as a moisture-proof cellophane adhesive, and in another form as a "blush-resister" in the lacquer industry.

8. *Carbitol* is employed as a high boiling lacquer solvent, as a softener in cosmetics, and as a solvent for essential oils.

9. *Ethylene Dichloride*, being an excellent oil and grease solvent, is helpful as such to the leather and textile industries. Mixed with one-quarter of its volume of carbon tetrachloride to make it non-inflammable, it is excellent as a fumigant for vaults, storerooms, and homes.

Practically all of the above compounds were laboratory curiosities 50 or 100 years ago.

Surveying with Light Waves

FEW fundamental investigations in physics have had a greater interest for scientist and layman than those conducted by the late Dr. Albert A. Michelson of the University of Chicago to determine the velocity of light. The

most recent one was made *in vacuo* and was completed shortly after his death last winter.

Not only is the numerical magnitude of this velocity of importance, but it seems possible that the Michelson method can be inverted and used to measure distance in terms of time and the velocity of light, after a suggestion made by Major William Bowie of the United States Coast and Geodetic Survey. If so, it will be valuable in mountainous country or between islands in an archipelago, where running precise base lines is a difficult undertaking by present methods.

The experimental basis for such a measurement of distance was laid by an earlier experiment of Dr. Michelson's when he measured the velocity of light between two stations in California, one on Mount Wilson and the other on Mount San Antonio, 22 miles away. The distance was measured by the United States Coast and Geodetic Survey with an accuracy of about one

part in several million, said to be the most accurate base line in the United States.

Time, the other component of velocity, was determined by starting a flash of light from one face of a many-sided mirror driven by a turbine at such a speed that the adjacent mirror face came into position in time to catch the flash on its return trip from the second station. The mirror speed was measured by conventional methods.

In measuring distance the experimental procedure would be reversed, and, instead of measuring the time taken by light to travel a known distance, one would measure the time taken by light to traverse the unknown distance and then work out the distance from the velocity of light previously determined. It should be noted in this connection that the velocity of light, as such, need not enter the measurement of distance, since the experiment can be considered as having been done in two separate steps: once over the known distance and again over the unknown distance.

The mirror speeds required by the measurement of distance fall into a range of rotational frequencies for which the frequency-measuring methods and apparatus of electrical communications have been developed. For example, a distance of ten miles and a 32-sided mirror would require a speed of approximately 500 revolutions per second, corresponding to a musical pitch in the first octave above middle C. Measurements that are accurate to within at least one part in a million could be made with relatively simple instruments.

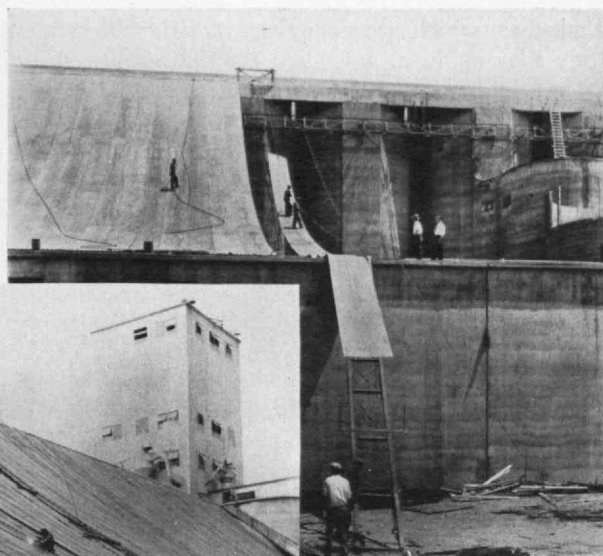
The practicability of the method has been demonstrated by the work of Dr. Michelson. Whether it is used to measure distance will depend largely on the need of the Coast and Geodetic Survey for base lines in inaccessible regions.

Much-Maligned TNT

"The things that can claw, and the things that can gore,
Are very untrustworthy things;
And a man with a sword in his hand, furthermore,
And rivers and women and kings."

SO Bhartrihari warned about 1,500 years ago. According to popular opinion, TNT and high explosives in general ought to be added to the list, for these, too, are commonly thought to be among the most dangerous things there are. The word, high, when used in connection with explosives, seems to many to convey the idea of high-strung and quick-tempered. TNT, in the movies and in the daily press, has become symbolic of all that is powerful and hazardous, dangerous and uncertain, of all that must be handled with circumspection

Steel awning being erected on one of the four huge grain elevators built for the Port of Albany, N. Y. The picture on the right shows one of the 3,700-pound roof sections being hoisted into place. To complete the roofs on all four elevators required 60,000 lineal feet of welds



Lincoln Electric Company

This new type of roof is said to be the first self-supporting welded steel roof in the country. It requires no columns, stanchions, or purlins

if the direst of consequences are to be avoided. But its evil reputation is not entirely deserved. It is powerful, to be sure, but it is not unreliable, and it is not so tremendously powerful when all things are considered. The explosion of a pound of TNT liberates an amount of energy of the same order of magnitude as that which is produced by a pound of sugar used as food in the human body. It acquired its reputation by doing precisely the thing which was expected of it, promptly and without waste effort. It is as trustworthy in its action as opium or alcohol.

TNT is one of the safest of the high explosives, and for military purposes is the most important. In appearance it is a buff-colored crystalline powder resembling brown sugar. If a bottle containing TNT should be dropped upon a concrete floor, the bottle would be broken but the TNT would not explode. TNT loaded in a tin canister is not exploded by the impact of a high-power rifle bullet. Teteryl, the high explosive which is universally preferred for boosters, is exploded under the same conditions, but it is not exploded by the impact of a rifle bullet if it is loaded in a pasteboard carton. Cyclonite is exploded even in a pasteboard box.

Thus, TNT is but little sensitive to shock. If loaded into a shell, it will stand the "setback" which occurs at the moment that the projectile starts to move in the barrel of the gun. Dynamite will not stand such shaking up. It is too sensitive for military use, and would, if loaded into a shell, blow the gun to pieces before the projectile could get started on its way. TNT will stand the impact of the shell against ordinary structural materials, and in practice the shell is made to explode by means of a fuse and relay device, after it has penetrated the target. TNT will not, however, tolerate the shock of impact against the heavy armor plate of battle cruisers, and armor-piercing shells are loaded with

explosives which are even less sensitive in order that they may explode, not when they strike the ship, but after they have reached the inside of it.

TNT melts at a temperature below the boiling point of water, and is generally loaded into shells by pouring. If a small quantity of TNT is heated carefully in a test tube, it vaporizes and the vapors condense again in the form of crystals on the upper and cooler portions of the tube. Unless great care is exercised in the experiment, the TNT "puffs off" and disappears in a small cloud of smoke by a rapid decomposition which is hardly an explosion and does not injure the tube. TNT burns with a smoky flame which is easily blown out if the amount of the substance is small. If the amount is large, as in a warehouse filled with the explosive, the situation is entirely different. Increased temperature increases the rate of chemical reactions. The heat of the burning raises the temperature of the material which is about to burn, the combustion becomes more and more rapid, and finally detonation sets in. It may be that the heat shakes up the molecules until they attain the velocity of detonation of TNT. It is also true that all high explosives are more sensitive to shock when they are warm.

TNT has a velocity of detonation of about 17,300 feet per second. That is, if a long tube is loaded with the explosive, and if detonation is started at one end by the firing of a blasting cap, then the explosion, or the explosive wave, travels along the column of TNT with a velocity of about three miles per second. It is this brisance which makes TNT so damaging.

At the present time there is no real need for more powerful explosives. TNT is powerful enough for such needs as now exist or can be foreseen. We could get along with less powerful explosives. Stronger ones would break our shells into fragments too small to produce the havoc which shells are designed to accomplish. Cheaper explosives are needed, explosives which can

be manufactured from raw materials of which the supply is abundant or unlimited, and explosives which are more insensitive than TNT but equally certain in their functioning.

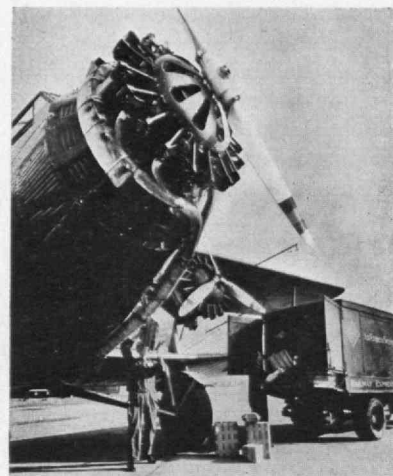
The Beneficent Boll

NEW uses for cotton, extension of its known applications, and improved methods of marketing are being developed in a campaign in which industry and government agencies are coöperating for more complete utilization of this great commodity. The results of this common effort, set forth in a recent issue of *Textile World*, reveal the versatility of cotton for innumerable purposes. Many of these are already familiar, while others, because the fiber is combined with various substances, are not generally known.

Cotton fabric, for instance, is now being successfully employed as a bond in highway construction. It was first used for this purpose in South Carolina six years ago and has demonstrated its value not only as a binder for road materials, but as a waterproof blanket. Open-mesh fabric is applied after an application of tar, which is followed by hot asphaltic oil and gravel as a top dressing.

No less striking is the use of 92,000 square yards of cotton for covering the Navy's new dirigible, *Macon*. Special fabrics also have been developed for covering airplanes. Cotton's importance in the development of automobile and aircraft tires is too well known to require comment. By the same token, highway markers and traffic guides are now being made of cotton fiber, which also enters into the manufacture of certain types of gears that operate with little or no noise, airplane propellers, and industrial truck wheels.

In building construction, cotton cloth has been introduced as a base for repairing old roofs, and in new buildings thousands of yards of fabric are used annually in covering the window openings during cold weather. Exterior panels characteristic of certain types of dwelling construction are now being made with a special cotton fabric. It is also employed in combination with thin veneers of fine woods, a recent development of unusual possibilities. As a wall covering, it is adaptable for a wide variety of decorative purposes, with unusual advantages for unconventional requirements in design.



United Air Transport

Air express is being recognized by the air transport companies as a substantial source of revenue and progress has been made toward a unified air express system



Brubaker

Lake Shannon and Baker River Dam at Concrete, Wash.

The use of cotton bags for agricultural products has increased greatly in recent years. Many of these present an attractive appearance to the consumer, and have been helpful in marketing such commodities as fruits, nuts, and vegetables in small quantities. The indicated annual potential market for potato bags alone is 30,000,000 square yards of cloth, and the consumption of bags for retail purposes in 1929 was five times greater than in the previous year. A nationally known chain store last year ordered 2,000,000 potato bags, and expects to need 3,000,000 this season. One grower in Maine estimated his requirements for bags at 5,500,000 for this year.

Studies are now being made to extend the use of cotton cloth for flour bags. Coal is also being sold in small bags which can be placed directly on the fire, thus avoiding the dust of handling loose fuel.

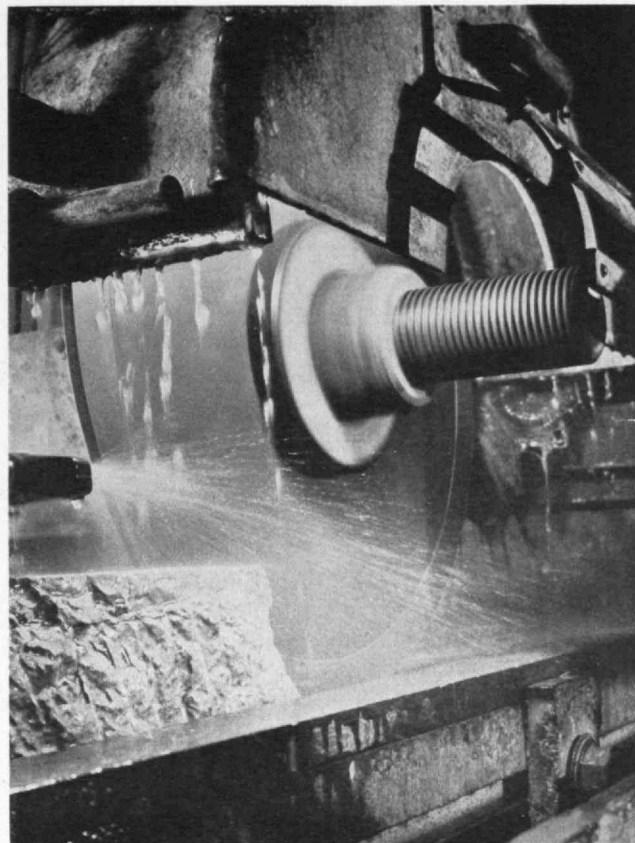
Not forgetting its own field, the industry has introduced special fabrics to take the place of jute in baling raw cotton. This innovation, which has been accepted by the transportation systems of the country, will result in a saving of freight because of the lighter weight of the new cloth. Assuming that this year's crop will be approximately 11,000,000 bales, it is estimated that 200,000 bales would be required for sufficient bagging material to wrap it.

While the use of cotton for clothing is very old, attractive new fabrics have recently found great favor, and their value has been much increased by methods of pre-shrinking the finished material. A crease-proof process, which is said to hold great possibilities in this field, lately has been perfected. New types of caps and neckties, and bags for holding refuse are recent applications of a commodity which has played an important part in the world's history in war and in peace, and has not yet reached the limits of its possibilities.

A Billion-Dollar Wind

By H. B. CHALMERS '00

A HUNDRED or more feet back of an automobile traveling at the present-day normal speeds, one observes at this time of year the leaves stirred up and whirling in the disturbed air set in motion by the passage of the automobile through it. To produce an arti-



Norton Company

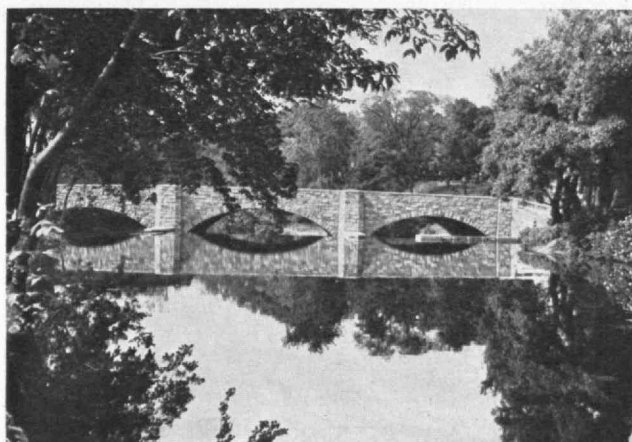
Grinding wheel slashing through a huge slab of marble

ficial wind takes as much horse power as that same wind could yield in moving a sailboat or operating a windmill.

For thousands of years, water was boiled in kettles and lids chattered from the pressure. But it remained for Watt to couple with the observation the inspiration which led to the invention of the steam engine. Similarly, the engineer, Paul Jaray, then at Friedrichshafen in charge of aerodynamics for Zeppelins, 10 or 12 years ago, observing the dust swirling behind an automobile, was inspired to invent. Jaray realized that approximately half the work the engine of the car was doing was producing dust and wind. Fortunately, he was familiar with aerodynamics, as he had, through mathematics and experimentation, evolved for Count Zeppelin the modern Zeppelin forms, quite different from the airships that the Zeppelin Company built before Jaray was put in charge of this work.

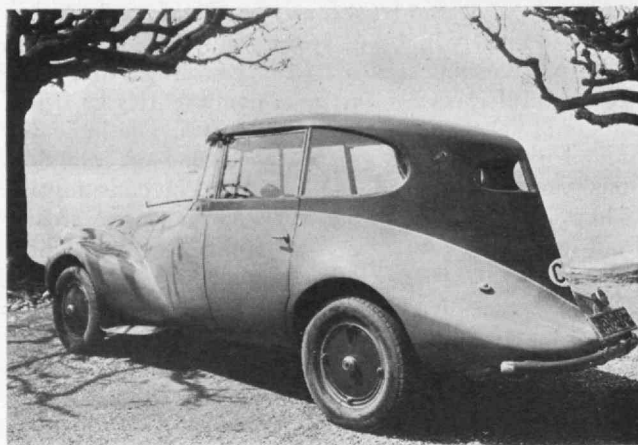
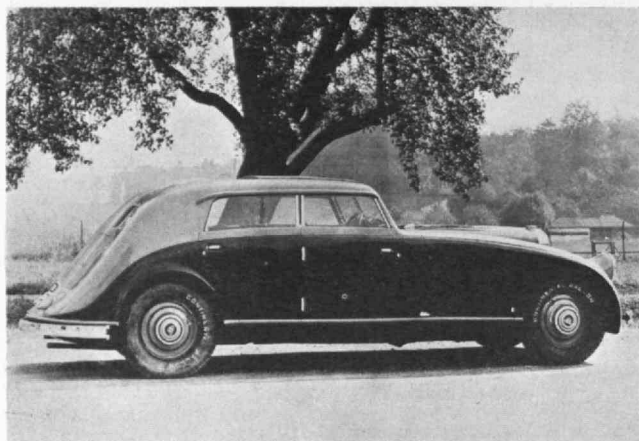
Applying his knowledge and mathematics to the aerodynamics of automobiles, Jaray invented one of the most useful improvements in the arts of recent times, and has had issued to him 24 German and other foreign patents. Upon his United States application for a broad patent, the examiner first replied that a shape was not patentable. Jaray, however, was able to prove that his invention, the streamlining of automobiles with due regard to ground effect, enables a 40 horse power engine to do work which formerly had required 80 horse power under normal present-day speeds. He was granted his patent, one of broad scope.

Jaray's first cars, built years ago, were effective from the aerodynamic standpoint. Unfortunately, they had an unnecessarily ugly appearance and created almost as



M.I.T. Photo

A bridge near Boston



Jaray Streamline Corporation

Examples of streamlined bodies on standard chassis. The car on the left is a Maybach; the one on the right, a Chrysler. The bodies have been designed in accordance with the Jaray system of streamlining

much amusement as the first "horseless carriages." More recently, many artistically beautiful designs have been worked out under the broad Jaray patents. In the last year or so, since Jaray's work was brought more forcibly to the attention of the automotive trade at a recent meeting of the Society of Automotive Engineers, the sawed-off, mud-scow shape of pleasure cars has been greatly modified and the trend is clearly and rapidly toward scientific streamlining.

In a comparative road test made in Switzerland, it was found that the Jaray car used 40% less gasoline in traveling over a fixed route than the standard car. This test was made on two Chrysler cars with identical chassis, on one of which had been built the Jaray invention. The other was the standard Chrysler sedan body. Forty per cent of the power in the standard Chrysler car was used to create artificial wind which was not created in the Jaray car. This test was made by the well-known automotive engineering firm, Ad. Bruderlein, and is, so far as known, the only actual road test which has been made to confirm the mathematical and aerodynamic theories involved. It also confirms the findings of numerous wind-tunnel tests made under laboratory conditions on small and finely built models.

In 1931 there were approximately 23,000,000 automobiles registered in the United States. Estimating that they used an average of 15 gallons of gasoline a week, they used 17½ billion gallons of gasoline in 1931. Of this 17½ billion, 40% (or seven billion gallons, costing, at 15¢ a gallon, one billion dollars) was used in producing an artificial and useless wind — a huge extravagance in which all motor users have joined.

The economy in fuel which the Jaray car accomplishes is not its only advantage. Coincident with this it has a greatly increased top speed for any given power plant. Also, the designer can take advantage of streamlining to reduce overall weight because of the fact that the power plant and other parts, due to decreased horse power, can be made lighter. Economy in construction of the vehicle follows and first costs are materially reduced.

The benefits of the increased air penetrability of the Jaray type of vehicle are not confined to increased mechanical efficiency. Greater comfort to the occupants

of the vehicle necessarily follows. A streamlined car is ideally adapted to a distribution of the mass along its length to produce the maximum of stability and safety in operation at high speeds. Rear-engine motor design, with the advantages of freedom from motor heat and motor gases, becomes convenient. Elimination of wind buffeting and unpleasant air currents inside the vehicle add greatly to the comfort of the passengers. Increased space is provided in the interior of the car for the convenience of passengers and convenient enclosed compartments are available for the storage of extra wheels, baggage, tools, and so on, with access from the exterior of the car. Ventilation is possible without objectionable drafts. Visibility is increased because of the shape of the car and in rainy weather drops of rain are sucked off the windows and do not interfere with vision.

The ease with which an automobile passes through the air is of equal importance to its horse power at speeds of 40 or 50 miles an hour and higher, which are in common use today. There is no doubt that salesmen will soon talk about the benefits of their specific streamlined car, as they used to talk about the benefits of the horse power of their engines. As exaggerated claims were made for the horse power of engines in the past when such horse power did not exist, it became necessary to define the unit so that the actual facts only could be stated for any specific car. It is now desirable to define streamlining in terms of the ease of moving through the air, or air penetrability.

I should like to give credit to Edward P. Warner, '17, Editor of *Aviation* and former President of the Society of Automotive Engineers, who made this suggestion at a meeting of the Society of Automotive Engineers, Metropolitan Section, March 24, 1932. He further stated that it would not be difficult to test a model of any given car and rate it for air penetrability by comparison in a wind tunnel with the air penetrability of a front projection of the same car. I hope that this matter will be worked out soon.

Not so long ago, a salesman of one of the best-known cars called my attention to the streamlining of his car. I asked, "Where is it?" and he pointed to a painted stripe along the side of the car!

THE INSTITUTE GAZETTE

Who's Who in Engineering?

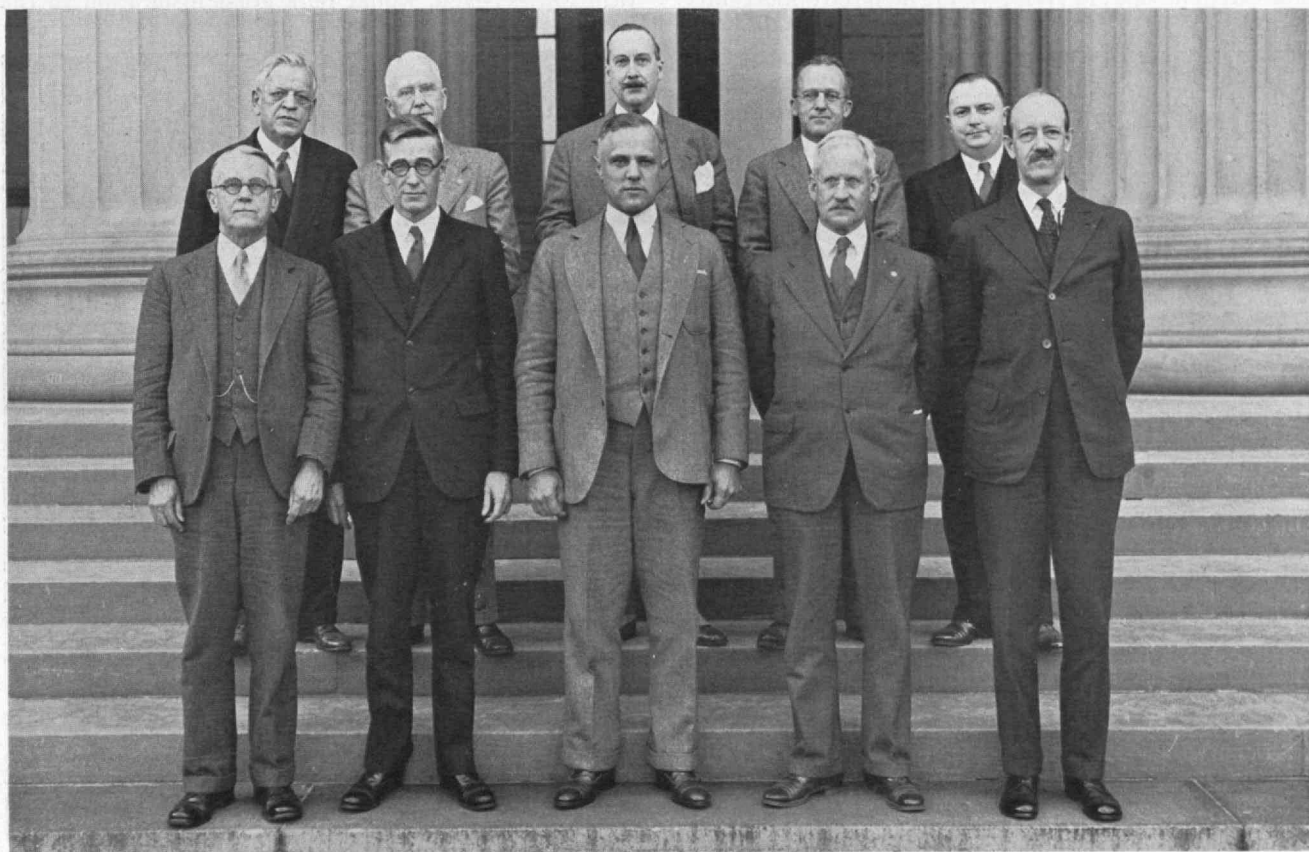
OF THE total of 8,643 engineers whose names appear in the most recent edition of "Who's Who in Engineering," 664 are Technology graduates, according to a study made by Dr. Donald B. Prentice, President of Rose Polytechnic Institute, and published in a recent issue of *Mechanical Engineering*. This survey includes graduates of American and Canadian colleges and universities, and gives the Institute first place in total number of prominent engineers listed. To avoid complications of judgment and interpretation in his investigation of the biographies, Dr. Prentice confined himself to a compilation of only those engineers who have been awarded degrees.

Cornell, second in the list, had 562 graduates, while the University of Michigan, with 385, was third. The fourth was the University of Illinois with 295; fifth, Columbia University, 282; sixth, University of Wisconsin, 269; seventh, Yale University, 256; eighth, Purdue University, 254; ninth, University of California, 207, and tenth, Lehigh University, 201. In addition to 131

colleges and universities which had seven or more graduates listed in "Who's Who in Engineering," 153 had six or less. Of the total of 8,643 engineers named, Technology, Cornell, and Michigan contributed 18.65%; and more than one-third of the total were graduated from the first eight institutions mentioned above.

Dr. Prentice found that most of the men included in the directory were graduated in classes from 1890 to 1920. The specifications of qualification for "Who's Who in Engineering" include acknowledged professional eminence, and ten years' active practice, of which at least five years must have been in charge of important engineering work. Teachers of engineering subjects in colleges or schools of accepted standards with ten years' experience, of which five must have been in charge of a major engineering course, are likewise eligible for inclusion.

On the basis of percentage of total number of graduates chosen for inclusion in the directory, the Institute stands fifth, with 4.2%. The Michigan School of Mines is first, with 7.27%; Rose Polytechnic Institute second, with 4.85%; Colorado School of Mines third, with



Technology's Administrative Council which, under the plan of organization established this autumn, meets weekly in the office of the President for discussion of administrative affairs. Front row (left to right): Professor Frederick S. Woods, Chairman of the Faculty; Vannevar Bush, Eng.D., '16, Vice-President of Technology and Dean of Engineering; President Karl T. Compton; Samuel C. Prescott, '94, Dean of Science; and William Emerson, Dean of Architecture. Second row (left to right): Charles L. Norton, '93, Director of the Division of Industrial Coöperation; H. M. Goodwin, '90, Dean of the Graduate School; Allan W. Rowe, '01, President of the Technology Alumni Association; Horace S. Ford, Bursar, and H. E. Lobdell, '17, Dean of Students

4.76%, and Worcester Polytechnic Institute fourth, with 4.68%. Technology's place in this comparison is, no doubt, a reflection of the rapid growth of its enrollment in the past 10 years and of the consequent youthfulness of a large portion of its alumni. The advantage in such a computation goes, of course, to schools of comparatively slow growth.

The effects of changes in methods of technical education and facilities in recent years and the swift development of graduate study in engineering, will be eagerly watched for in future issues of "Who's Who in Engineering."

Technology Receives Portraits

THE Institute on October 25 became the recipient of the first four of what is to be a notable series of portraits of distinguished scientists and engineers, which are being painted under the patronage of Mr. and Mrs. Henry A. Wise Wood of New York.

To the unique ceremony of presentation in the Forris Jewett Moore Room were invited members of the Corporation and Administration and their wives, and the heads of those Departments in which the achievements of the subjects of these portraits have particular significance.

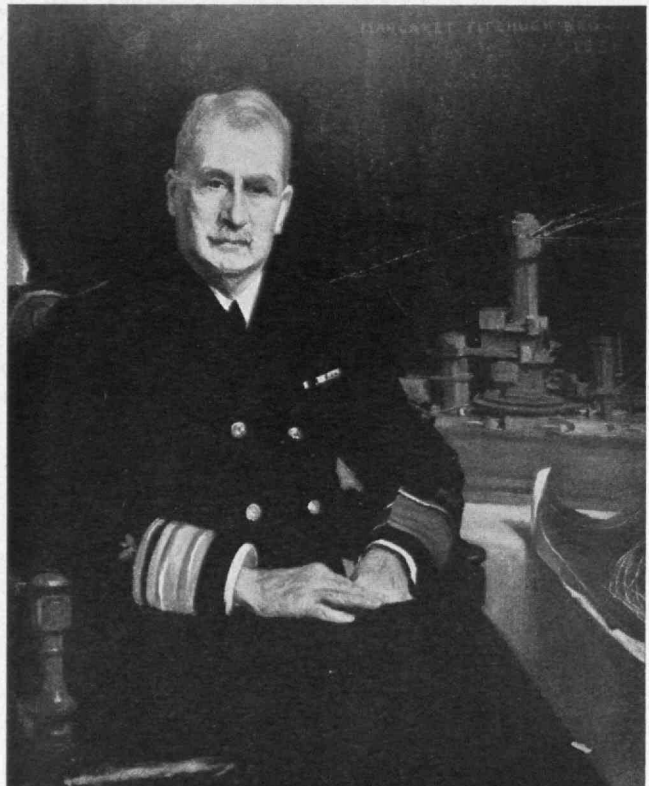
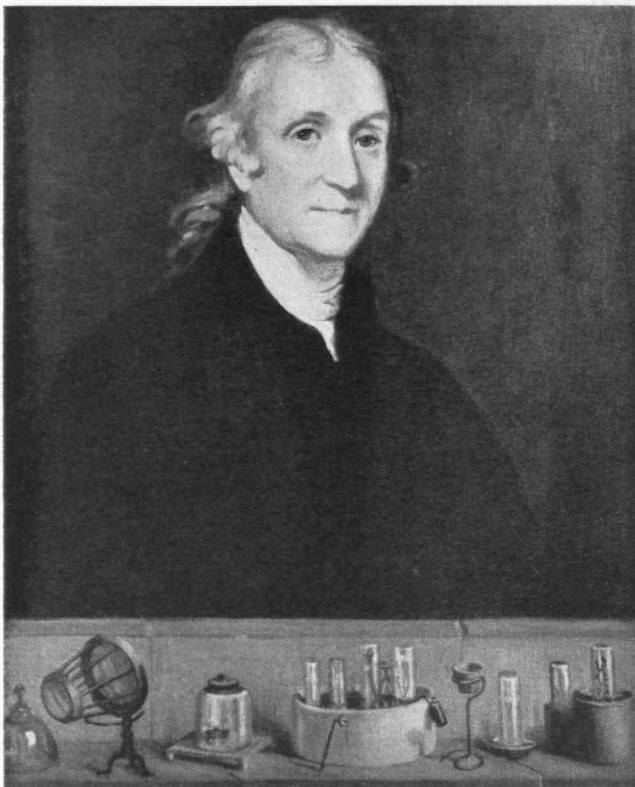
In a brief address of presentation, Mr. Wood explained the purpose of the portraits. He and Mrs. Wood are interested, he said, in giving young men the opportunity

to gain a clearer conception of the personalities of great leaders in the scientific world. In view of the importance of science and engineering in our present civilization, Mr. Wood believes that their fundamental cultural significance should be given greater emphasis in education. To technical training he also would bring closer acquaintance with those intellectual and artistic subjects which express and interpret our modern culture.

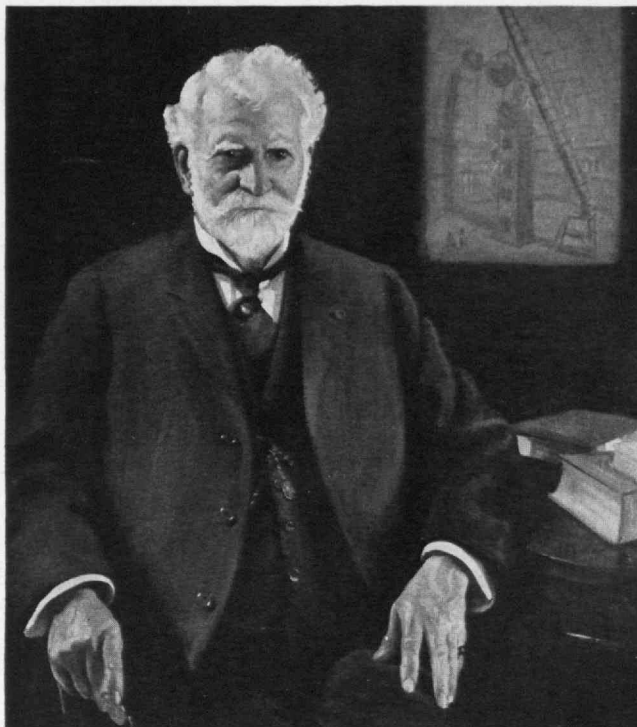
With the development of this project, Mr. Wood selected Technology as the most appropriate place for these portraits. The four presented to the Institute were painted by Miss Margaret Fitzhugh Browne, who is to continue the undertaking. The artist is known for her outstanding success in portraying accurately and effectively on canvas the personalities of great men.

Following Mr. Wood's presentation address, the reasons for selecting the first four subjects were outlined briefly by representatives of the four Departments, Dr. Vannevar Bush, '16, speaking of Dr. Elihu Thomson, Professor James R. Jack describing the work of Admiral David W. Taylor, Professor Edward F. Miller, '86, giving a short talk on the work of Dr. Ambrose Swasey, and Professor Frederick G. Keyes describing the life and work of Joseph Priestley.

President Compton then accepted the portraits in the name of the Institute and called attention to the fact that this was in a sense the fruition of a project very close to Dr. Stratton's heart. These personalities, Dr. Stratton believed, would be a great inspiration to the



Two portraits in the Browne Collection. Left: JOSEPH PRIESTLEY (1733-1804), chemist, non-conformist minister, and friend of the American Colonies, whose pioneering researches in the chemistry of gases, including notably the discovery of oxygen, were fundamentally significant in creating the science of chemistry. Right: DAVID W. TAYLOR (1864-), Rear Admiral, United States Navy, who applied hydrodynamics to increase the efficiency of ships and who was Chief of the Bureau of Construction and Repair during the Great War. He was principally responsible for the training of the United States Naval Constructors in America through cooperation between the United States Naval Academy and the Massachusetts Institute of Technology



Two more of the portraits given Technology by Henry A. Wise Wood. Left: AMBROSE SWASEY (1846-), a patron of engineering and himself a mechanical engineer who has contributed notably to the progress of engineering and industry through the development and manufacture of tools of such high precision that it was only natural that he should have been the one to design some of the world's greatest telescopes. Right: ELIHU THOMSON (1853-), scientist, engineer, and inventor, around whose many discoveries and inventions, particularly in the field of electric power control, distribution, and utilization, has been built much of the modern electrical industry, and whose interest in the education of young men has found expression in his long service to the Massachusetts Institute of Technology as a member of its Corporation and its Executive Committee, and in one critical period as its Acting President

young men who year after year are having their characters moulded during their professional training at the Institute.

Immediately after the presentation ceremonies, the portraits were taken to their permanent locations, where they were viewed by the guests, who later assembled again in the Forris Jewett Moore Room for an informal reception and tea.

The guests of honor on this occasion were Dr. Elihu Thomson and Dr. Ambrose Swasey. Unfortunately Admiral David W. Taylor was unable to be present on account of illness.

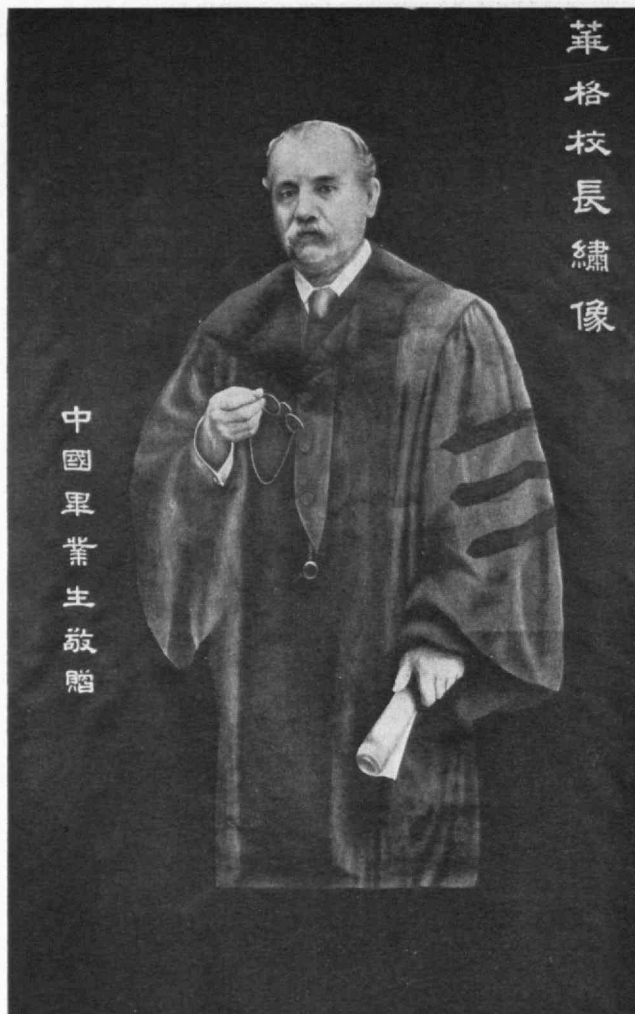
Mr. Wood announced that plans were under way for a second group of portraits, one of which will be of the late Dr. John R. Freeman, '76.

The portrait of Admiral Taylor hangs in the entrance of the Pratt Building for Naval Architecture just in front of the entrance to the Naval Museum. Dr. Swasey's portrait hangs in the headquarters of the Department of Mechanical Engineering, and that of Dr. Thomson in the headquarters of the Department of Electrical Engineering. The portrait of Joseph Priestley at present hangs in the Forris Jewett Moore Room in the new George Eastman Laboratories. Ultimately it is expected to be placed on the chemistry side of the entrance lobby in this building, being matched by a companion picture of Faraday on the physics side. This portrait of Faraday is another of the group of additional portraits which is soon to be painted by Miss Browne under the auspices of Mr. Wood.

Patent Policy

PRESIDENT COMPTON, in his annual report to the Corporation this fall, directed attention to an aspect of scientific research which requires the serious consideration of all research institutions if the welfare of the public is to be conserved: What attitude should be taken by an institution toward the development of important discoveries and inventions made by members of its Staff and in which it may be fairly considered to have an equity? An acceptable answer to this question requires a recognition of two broad principles: (1) that responsibility does not always end with mere publication of a patentable, scientific discovery or invention; the public benefits derivable from the patent laws and contemplated by the framers of those laws should not be lost through a failure to solicit patent protection; (2) that any income accruing from patent control should be utilized by the institution for the ultimate benefit of the public.

"It is difficult," said President Compton in his report, "to estimate the extent to which the attention of the staff and the use of facilities have been directed toward the development of patentable inventions. Four things are, however, certain: (1) the nature of the work and of the contacts in an institution like ours are particularly favorable for such activities. (2) Such activities are occasionally of considerable importance by way of service to the public and as potential sources of financial profit. (3) The Institute should have an equity in such



An embroidered portrait of Francis A. Walker, President of the Massachusetts Institute of Technology from 1881 to 1897, which has been presented to Technology by Chinese alumni. Formal presentation was made through the Technology Club of Shanghai at the first meeting of the Alumni Council. More than a year was required to complete this unusual portrait, the work of Chinese artists, who with amazing skill created a life likeness in silk threads. Translation of the Chinese inscription on the left is: "Respectfully Presented by the Chinese Graduates." On the upper right the inscription reads: "Embroidered Portrait of President Walker." Many of the outstanding engineers in China were educated at Technology and this gift was presented as a token of gratitude for their technical training

developments as are made with the aid of its facilities. (4) For the best interests of the public, important inventions should be patented and developed commercially.

"In order to establish an Institute policy on patents which will fairly recognize the equities of the Institute and the individual inventor, safeguard the interest of the public, and create a favorable environment for the adequate development of important projects, a committee of the faculty has given careful study to the problem and to the various plans which have been adopted in other educational institutions. This committee has recommended the following policy regarding patents which has been approved by the Faculty Council and by the Executive Committee of the Corporation and which may be summarized briefly as follows:

"1. Inventions or other developments, whether or not subject to patent or copyright, resulting from a program financed entirely by the Institute, shall be the exclusive property of the Institute, which may at its discretion acquire title to any such patents or copyrights which shall be administered for the ultimate benefit of the public. If after a reasonable period the Institute does not choose to acquire such right, provision is made whereby that right shall revert to the individual who made the invention or development.

"2. Inventions or developments produced by a staff member or student along lines unrelated to an Institute program with which the individual may be connected, and to the production and development of which the Institute contributes nothing in a substantial way in funds, space, facilities, or time of a staff member, shall be the exclusive property of the individual producing the invention or development.

"3. In intermediate cases where the costs of the development are borne jointly by the Institute and the individual, equities shall be divided substantially in proportion to the contributions, in accordance with a special agreement in each case, except that in the absence of any such agreement the title remains with the Institute.

"4. If such development is produced by a student who is paying tuition or who has received scholarship aid, it shall be considered that the Institute is not contributing to the research, inasmuch as space and facilities are considered to be provided for by the tuition payment. Similarly, if such developments arise in the course of work carried on under contract by the Division of Industrial Coöperation for an outside party which pays all expenses connected with the research, including overhead, the Institute shall have no claim to inventions resulting therefrom."

A committee of the Faculty is now studying the most effective ways to administer this policy.

161st Council Meeting

THE meeting of the Alumni Council in Walker Memorial on the evening of October 31 was notable for three things: (1) a large attendance (84), (2) the presiding of Allan W. Rowe, '01, new President of the Alumni Association, and (3) the acceptance by the Council, after a deliberation of three years, of a new plan of Alumni organization as embodied in a rewritten constitution and set of by-laws. The Council voted that the new constitution and by-laws should be transmitted for ratification to every former student of the Institute when the regular ballots are mailed in the spring.

The Secretary, Charles E. Locke, '96, reported that at the meeting of the Executive Committee prior to the Council meeting the Treasurer of the Alumni Association reported that the Association concluded its last fiscal year on June 30 with an operating deficit of \$889.74, but that this deficit is more than offset by profits derived from the operation of The Technology Review. Reporting for The Review, H. E. Lobdell, '17, said that the dues collected as of today numbered 4,793, which was 1,341, or 21.3% behind October 31, 1931.

(Continued on page 110)

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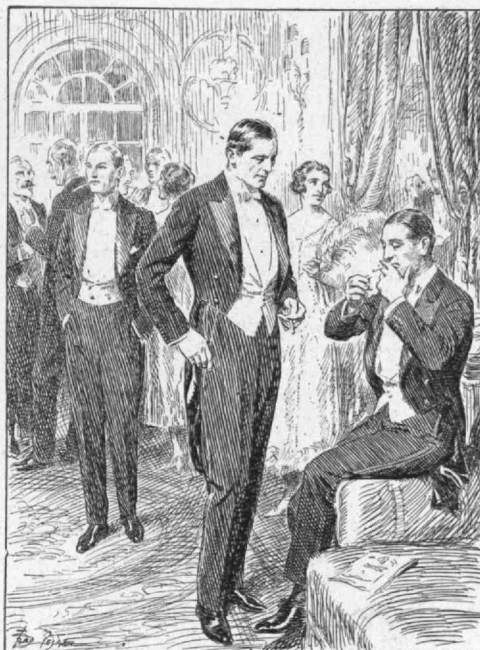
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2. Pylon of Building One
3. Dome from Eastman Court
4. Walker Memorial
5. President's House
6. Pratt School of Naval Architecture and Marine Engineering
7. Rogers Building on Boylston St.
8. Dormitories in Rear of President's House
9. Runkle Hall — Dormitory Group
10. West Pylons in duPont Court
11. Lowell Court
12. Mercantile Building, Summer St., Boston, Where Technology Began Its Work February 20, 1865

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DEPRESSION HATH HER VICTORIES

(Continued from page 89)

by 34 Federal agencies increased 29.6%. The number of other employees increased 11.2% for the same period.

Legislation authorizing the appointment of 12 committees to assist in the selection of sites for public buildings outside the District of Columbia was successfully opposed because its provisions would have resulted in delaying public construction instead of expediting it. On the other hand legislation empowering the Secretary of the Treasury to contract for topographic surveys of sites, test pits, and borings without competitive bids, and to limit the number of days for advertising for bids for sites for public buildings was supported, because this legislation would expedite Federal construction.

The Council supported the successful effort of the U. S. Coast and Geodetic Survey to secure appropriations to make seismological studies in California and also an appropriation of \$30,000 whereby the Survey is participating in the Second Polar Year Program (see the Review for July, 1932). It was also instrumental in securing increased appropriations for the fiscal year 1931-1932 for the U. S. Geological Survey. This consisted in an increase of \$100,000 for research, \$235,000 for water resources, and \$101,000 for topographic surveys. Strenuous efforts were made to maintain the same total appropriations for the fiscal year 1932-1933 without avail.

The engineering profession has for ten years advocated and worked for an Administration or Department of Public Works wherein would be concentrated all the engineering, architectural, and construction work of the government. It is evident that such an administration or department would offer far greater possibilities of long-range planning with subsequent stabilization of employment than can now be obtained under the present system of a multitude of bureaus. The Council has for some time advocated legislation to this end and it is gratifying to note that the first session of the 72nd Congress included as a part of the economy bill legislation providing for an excellent start in this direction.

For some time a committee of engineers has been studying the growing tendency of governmental agencies, federal, state, county, and municipal, to encroach upon the field of activity of the private engineer. The data compiled by this committee has been recently submitted to the House Committee on Governmental Competition with Private Enterprise. The latter committee has been making an exhaustive study of this problem and has compiled voluminous data from many sources. It is to be hoped that its efforts will result in legislation which will more clearly define the purview of governmental agencies engaged in engineering work.

The organized engineering professions supported the bill providing for the advanced planning and regulating of public works construction for the stabilization of industry and for aiding in the prevention of unemployment during the periods of business depression. This legislation established the Federal Employment Stabilization Board. The engineering profession was instru-

mental in having appointed as director of this board a high-grade, experienced construction engineer as well as the employment of other engineers.

The assistance of the Council was sought by the Department of Commerce in securing sufficient appropriations to enable the establishment of a Foreign Construction Division, the function of which would be currently to collect and make available reliable information as to contemplated construction work in foreign countries and to serve as a source of advice in relation to foreign contracts for machinery, building material, labor, and the like. This Division has been established and should prove of great value to those in any way associated with the construction industry or who contemplate doing work in foreign countries.

During the spring of 1932, several bills were introduced in the first session, 72nd Congress, providing for greater federal participation in relief work and extension of credit for construction purposes. The Council directed its best efforts and cooperation to the end that the legislation would not contain features inimical to the public welfare; that it would be workable; that it would provide federal financial aid for sound self-liquidating public works. The enactment, known as the Emergency Relief and Construction Act of 1932, provides for direct loans to states for relief work, loans to political subdivisions (and in certain cases private corporations) for the purpose of constructing public works which are self-liquidating in character, and further, for the advancement of federal funds for governmental activities already authorized. With the exception of the first provisions of the act, all activities which it provides for are of an engineering nature.

The above examples of the profession's activities in legislative matters do not by any means cover the entire range. They are merely cited as those cases which had the most direct bearing on the problem of unemployment relief and reconstruction. Many other pieces of legislation having an indirect bearing on the problem were also considered and acted upon.

The Council was instrumental in securing the appointment by the Reconstruction Finance Corporation of an Engineers' Advisory Board consisting of five prominent engineers who were selected from a list of competent men submitted by the Council. The R. F. C. has more recently invited the Council to assist in selecting engineers for appointment to the 32 advisory committees in the various R. F. C. districts. These engineer members of the District Advisory Committees serve without pay, as do the other members of the committee who have been drawn from banking, legal, and business circles. That engineers are willing to respond to the call for public service is evidenced by the acceptance of the invitation extended to these prominent engineers.

Since the establishment of the Federal Home Loan Banks the Council has endeavored to assist in recommending engineers qualified to engage in appraisal work for the district banks. This activity has been carried on through the Council's State Committees on Engineers and Employment.

It is not to be inferred from the above that the Council has been the only organization interested in promoting national efforts to relieve (*Continued on page 106*)

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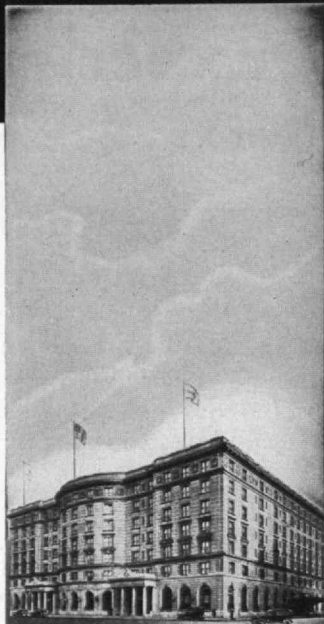
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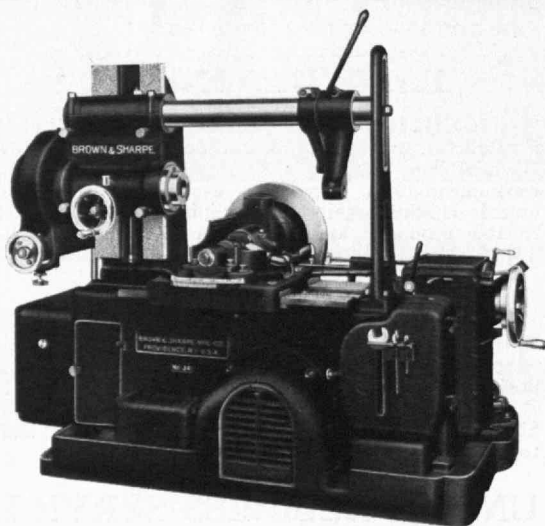
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DEPRESSION HATH HER VICTORIES

(Continued from page 105)

unemployment and to aid engineers. It was early realized that the best results could be obtained only through hearty coöperation with other bodies. To this end the Council and its member organizations collectively and severally have consistently coöperated with such organizations as the American Institute of Architects, Associated General Contractors, and other national public and private organizations in such efforts.

From the very beginning the profession assisted the President's Emergency Committee for Employment in many directions. In the early fall of 1930, the Council with seven other professional and trade groups assisted in the organization of the Public Works Section and supplied it with expert staff assistance. The Council alone formed 140 field agencies to collect the necessary information, and something in the order of 800 or 1,000 engineers participated in this work. General C. W. Kutz (member A. S. C. E.) represented the Council on the staff of the Section, devoting his entire time thereto for many months without compensation. The Section listed all authorized and proposed public and semi-public construction projects, ascertained the status of each, and if any were being unduly delayed made an effort to remove the cause thereof so that the work could go forward.

Early in 1932, the Council again assisted the Public Works Section by making an exhaustive canvass of possible construction projects similar to the survey made in the winter of 1930-1931. This information was collected in 27 states by the Council's State Committees on Engineers and Employment. The other states were canvassed by the American Institute of Architects and Associated General Contractors. The work of the Public Works Section has been very effective in stimulating construction and relieving unemployment. The results of its survey formed in a large part the basis which governed the recent legislation directed toward relief and reconstruction work. In the early part of 1932, a similar public works survey was made by the American Society of Civil Engineers.

In addition to public works activities of the President's committees, information was collected concerning what industrialists had done and were doing to maintain employment and relieve unemployment. The American Society of Mechanical Engineers, American Institute of Electrical Engineers, and other national bodies aided materially in this effort.

All of the above activities of the Council have required nation-wide support and assistance. In order effectively to represent the widespread engineering interests and opinions of the country, one of the first moves in organizing for relief and reconstruction work was to appoint at least one committee on Engineers and Employment in each state. These committees were formed with the aid and advice of the various national, state, and local engineering societies, and the committee memberships are made up of representatives of these societies. They have been invaluable in crystallizing opinion and in providing information and inaugurating in their own districts the programs planned by national bodies.

IN recent years, governmental and social problems have increased in their complexities. Throughout the many ramifications of these problems there runs a continuous thread of technical and engineering influences. It is almost universally conceded that any great steps toward reconstruction and correction of present day conditions must include the sane thinking and action of the engineering profession. The importance of the engineer in the present day situation cannot be over-emphasized. It is gratifying to see that the engineer through his representation of engineering societies is fully doing his part. It is important that he take a broad viewpoint in this work as the recent disaster which has overtaken this country is a clear indication that more is needed than merely rectifying the emergency conditions of today. Some particular program must be evolved to prevent recurrence of these conditions. Undoubtedly the engineer can take a great part in the formulation of such a program, and it is to be hoped that he will prove as equal to this occasion as he has in the many lines of endeavor which have given him his enviable reputation in our present civilization.

ELBOWROOM FOR INDUSTRY

(Continued from page 86)

vious decade. With the exception of communities of 5,000 or less, all those with 100,000 or less showed comparatively little change. Operations due to the late war probably account for many of these changes.

Table A

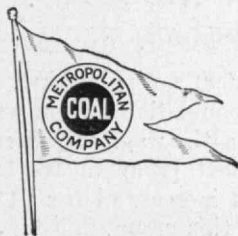
Size of Community	1910-1920		1920-1930	
	Popu- lation	Wage Earners	Popu- lation	Wage Earners
1,000,000 or larger.....	19.3%	20.4%	48.5%	14.2%
500,000 to 1,000,000.....	106.7	127.1	-7.3	-21.4
250,000 to 500,000.....	15.0	31.8	75.2	33.3
100,000 to 250,000.....	34.7	68.9	15.7	-13.4
50,000 to 100,000.....	26.0	37.1	23.3	-7.4
25,000 to 50,000.....	26.1	53.4	26.6	-4.1
10,000 to 25,000.....	25.7	21.1	31.0	-6.0
5,000 to 10,000.....	17.5		18.0	
2,500 to 5,000.....	18.4		2.7	
All Urban Communities....	28.8	36.1*	27.0	-2.1*

*Total United States.

It was also estimated that the following proportion of the total population resides in cities of over 1,000,000:

Year	Per Cent of Population In Cities of Over 1,000,000
1910.....	9.2%
1920.....	9.6
1930.....	12.3

The distribution of wage earners in manufacturing, according to size of community as shown by Table A, reveals some interesting trends. By comparing the change in total population with the change in wage earners in manufacturing, it may be seen that while the total population increased for cities of over 1,000,000 from 19% to 48% for the period 1910 to 1930, the concentration of manufacturing wage earners actually declined from 20% to 14%, a substantial decline. For the group of cities having a (Continued on page 108)



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ELBOWROOM FOR INDUSTRY

(Continued from page 107)

population of 500,000 to 1,000,000 a very marked decline took place, both in total population and in wage earners; no important change in the wage-earner concentration took place in the next group of 250,000-to-500,000, in spite of the rapid increase of from 15% to 75% in total population for this group. Substantial declines occurred for all the other groups.

While this tabulation shows that concentration of total population was still going on up to the beginning of the depression for cities in the group 250,000-to-500,000 and for those over 1,000,000, the report points out that manufacturing wage earners do not constitute the major part of the increase of population in these cities. There is considerable evidence that during the period of depression a still further decline in the concentration of manufacturing wage earners in the larger cities has been taking place.

Additional evidence of the dissolving of local concentration of industry is shown by the following computation:

Distribution of 105 Instances of Local Concentration According to the Census Date at Which the Community Reached its Highest Percentage of the National Total¹

1899	32
1904	21
1909	15
1914	4
1919	14
1923	9
1925	10

These data were obtained "from examining all cases for which continuous records were available since 1899 for communities which at some time produced at least 3% of the national product in some industry. In this way it was possible to obtain records for 105 instances of local concentration. The percentage which each community was of the national total was then computed for each census date to determine whether it was gaining or losing in relative position. . . . It is quite conclusive that one-half the cases examined reached their highest point by 1904, and that but 10 of the 105 were at their highest point when the record ended."²

Factors that Will Assist Towards the Dissolving of Concentrated Industries

That dissolving of concentration of industry is taking place is evidenced by the policies pursued by several large companies. The Ford Motor Company builds assembly plants at suitable points to serve its various markets throughout the country, a decentralization of some of its manufacturing and assembly operations. The General Electric Company has a policy of acquiring or building new plants for new products, rather than concentration of manufacture at Schenectady. Dissolving of concentration is also brought about by the eco-

nomics of distribution and marketing resulting in many companies locating branch plants at strategic points to serve better their markets.

What has probably not been realized, up to the present, is the menace to society as a whole of large masses of workers thrown out of employment with no means of support. We must learn to plan better. When we realize the fundamental relationships between the support of workers from the land and from industry, or, as Mr. Ford puts it, with factory and farm as partners or factory and suburban gardens as partners, then perhaps accelerated dissolution of concentration will take place to the lasting benefit of workers, employers, and society.

Modern means of transportation and communication permit centralized control of isolated units. With tele-types and other advanced methods of communication, this control will be rendered speedier, easier, and more satisfactory.

Local advantages become increasingly less important with increased facilities in transportation and greater mobility on the part of industrial workers. This is so markedly true that the problem of locating any new industry has become one of economic consideration into which many factors must enter.³

Studies of wastes in distribution will probably be a real factor in dissolving industrial concentration. If it is true, as some of us believe, that our production technique is far ahead of our distribution technique and that improvement in production technique is reaching the point in many instances of diminishing returns, then manufacturers in the future must look for their profit in better distribution technique and the elimination of many of these distribution wastes. This means that scientific plant location, branch plant location, and so on will be the order of the day and that plant locations will be chosen with a scientific regard for the factor of distribution. It is a significant fact that scientific marketing analysis and marketing have measurably lagged behind scientific production methods.

It is believed that in the past too much weight has been given to population as a basis for distribution. Mr. Holmes makes this observation: "It has often been pointed out that manufacturing goods cannot be sold to square miles of land. Neither can they be sold to thousands of people. The theory that population is an index of the market for manufactured commodities is false. No one article is consumed or one service purchased precisely according to the distribution of population. The potential market for a manufactured product depends upon many different factors."⁴ Scientific marketing then will bring about the dissolving of industrial concentration.

The author believes there are illimitable possibilities in the proposed research in agriculture to produce perennially for industry many of the raw materials it needs and many new ones. There should ensue much desired diffusion of labor to extraction plants in the agricultural districts which would further bring about as a concomitant result, in all probability, dissolving of industrial concentration. (Concluded on page 109)

¹ "Recent Economic Changes," Volume 1, p. 215.

² *Loc. cit.*

³ Kimball, "Industrial Economics," p. 62.

⁴ "Plant Location," p. 21.

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ELBOWROOM FOR INDUSTRY

(Concluded from page 108)

Just what part the airplane may play in the dissolving of industrial concentration and in widening the radius of activity of industrial workers is difficult now to foresee, but it is conceivable that it might extend their radius and their mobility almost as much over the automobile as the automobile did over the horse and buggy. We could then visualize ourselves as living on a farm or in an agricultural community 100 or more miles away from our offices and require no more, or perhaps less, time to commute than we now take. The factory could readily be 100 or more miles from the office, located in a large city, and yet be readily accessible.

That there will be a drift away from the large centers, both of industry and of people, to points where both can enjoy the benefits of relatively unconfined space is my firm belief.

Conclusion

There is sufficient evidence to conclude that, as a result of economic and sociologic forces, our industrial pattern is undergoing a change. There is a growing consciousness that after all there are no such beings as supermen, that perhaps there is a limit to man's comprehension, that maybe we can get physical units too big and aggregations of employes too large for sound and efficient administration and management. We are realizing that cities can become too large for comfort, well-being, safety, and efficient administration, that the advantage of a large city location for industrial units, except for those organizations which must of necessity be located in or immediately adjacent to a metropolitan area, can be more than offset by the disadvantages.

Again, there is a growing consciousness of the economic insecurity of masses of our population living in the large cities whose sole dependence is on a regular pay check, and that, while business continues to move in cycles, whole sections of the population can and are temporarily dislocated, disorganized, and in distress; that this imposes huge burdens on the employed population, the employers, the city welfare organizations, the city administration, and the state, sometimes, as at present, greater than their resources can sustain,

and that therefore we have thrown our rural and urban population out of balance, as shown in the following table:

*The Shift in Population from
Rural to Urban in the United States*

	Urban	Rural
1930.....	56.2	43.8
1920.....	51.4	48.6
1910.....	45.8	54.2
1900.....	40.5	59.5
1890.....	36.1	63.9
1880.....	29.5	70.5
1870.....	20.9*	79.1
1860.....	16.1	83.9
1850.....	12.5	87.5
1840.....	8.5	91.5
1830.....	6.7	93.3
1820.....	4.9	95.1
1810.....	4.9	95.1
1800.....	4.0	96.0
1790.....	3.3	96.7

All of the above considerations are leading thoughtful men and women to the conclusion that we can best bring our population into balance, strengthen our economic position, bring more light and happiness into lives of thousands of families if the process of the dissolving of industrial concentration is speeded up.

*1870 and prior on basis of 8,000 inhabitants or more. Since 1880 on basis of 2,500 or over.



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NIGHT WATCH AT OBERNACH

(Concluded from page 92)

salt solution had been injected; hours with long paper chronographic ribbons tabulating current meter turns or enlarging curves of the Allen salt-velocity method — yet ever with the laborious, careful, error-chasing effort which characterized that first night shift.

German genius for thoroughness, for progress, for improvement in scientific methods. Yet Germans are human too — at least the Bavarians! For who could live in those mountains, sport around in leather shorts with a sky-high feather in the cap, and not be human? Could a cold-blooded hydraulician strip off his shorts of an evening and plunge into the measuring basin to practice the American crawl? Hardly — yet they did, till the drowned mice drove them out!

Little wonder that I returned again a year ago. Finally for the fourth year in succession the Walchensee proved too great an attraction for me to resist. True, the rain was more persistent than ever, but even rain must stop sometime, and up the valley a long model for a Chinese river, the Yellow River, neared completion. For Geheimrat Engels, father of small-scale laboratories, had come to Obernach a second summer to substantiate his earlier indoor tests on a large-scale reproduction in this greatest of outdoor laboratories.

THE INSTITUTE GAZETTE

(Continued from page 102)

The Secretary further reported that the Executive Committee had elected 37 new members, whose credentials had been passed upon by the Dean's office, and had accepted with regret the resignations of three members. It had been voted to hold the customary joint meeting with the Faculty Club in the spring, and the November meeting would probably be a talk on China. Visits to local clubs made, or contemplated, were as follows: Messrs. Lobdell and J. Rhyne Killian, Jr., '26, during June to August, inclusive, to Niagara Falls, Milwaukee, Minneapolis, Duluth, Butte, Seattle, Portland, San Francisco, Los Angeles, Salt Lake City, and Denver; President Compton to Portland, Ore., July 2; Seattle, July 6; Detroit, July 24; and Akron, August 21. Clair E. Turner, '17, to Honolulu, July 1; G. B. Waterhouse to Buffalo, October 5; and Dean Vannevar Bush, '16, to Pittsburgh, November 3. Dr. Tryon makes a southern trip during November and December and will visit the Richmond and Jacksonville clubs. Drs. Compton and Bush will be able to visit certain clubs in connection with trips planned for the winter, and Dr. Rowe is also going to be able to meet a number of clubs in the East in connection with some of his other engagements. The new alumni pamphlet of officers, council, club representatives, honorary secretaries, and so on, has been printed, and was at the plates of those attending the dinner.

(Continued on page 112)



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INSTITUTE GAZETTE

(Continued from page 110)

The following report of the Committee on Audit and Budget was presented by the Secretary, in behalf of the Chairman of the Committee, Dr. Rowe:

"During the summer the report of the auditors for the fiscal year of the Alumni Association ending June 30, 1932, was received. There are a few matters which call for brief comment, although the individual items have probably all been presented to you during the course of the year by the Treasurer, Mr. Killian, or some other member of the group concerned with the finances of the Association.

"As a result of a falling off in paid memberships to the Association, and from other like causes, the income for the fiscal year covered by the report was nearly \$3,000 less than in the preceding year. By excellent management and the exercise of rigid economies, the expenditures were curtailed nearly \$2,000; so that the net decrease, without the final profits from *The Review*, was something less than \$1,000. This left a net operating deficit of something under \$900, which can be and has been met by the profit on Volume 34 of *The Review*. This is the first time in very recent years that we have shown a deficit, the operating profit, however, for the year 1930-1931 being \$45 on a gross budget of \$36,000.

"In the same way, *The Technology Review* showed a diminution in their total profits of about \$1,000. In the allocation of the net profit, however, the Alumni Association receives only \$400 less than in the preceding year, and the total benefit to the Association exceeded \$3,000.

"On the books, we have at the present time a surplus of over \$5,000 which has been slowly growing during the past few years; so that we may regard the Association as in a very sound financial condition.

"We face a further decrement in income for the present year, and a review of the economies effected last year in the management of the Association indicates that it will not be possible this year to parallel decrements in outgo as effectively as it was in the year 1931-1932. This implies the necessity of the consideration of other mechanisms for balancing the budget of the year 1932-1933.

"Reporting on the audit, your committee wishes to state that the certified public accountants, Patterson, Teele and Dennis, found all accounts and records in a most satisfactory condition. Your committee confirms the audit, and recommends its acceptance by the Council with the expression of the appreciation of the latter to the Treasurer and his associates for the extremely efficient way in which the affairs of the Association have been conducted during this period of financial stress."

The Chairman gracefully expressed appreciation of the Council members to F. G. Keyes, Head of the Department of Chemistry, J. C. Slater, Head of the Department of Physics, J. C. Boyce, also in the Physics Department, Frank Conant of the Photographic Service, Horace S. Ford, Bursar, and all others who had participated in the arrangements for open house in Building 6 and 11 to allow inspection by Council members prior to the dinner of the evening.

Special mention was made of George R. Harrison of the Physics Department, who had initiated the arrangements in his division, and had been prevented from carrying them through by a sudden attack of appendicitis calling for an operation. He was reported to be making excellent progress.

The members of the Council in filing into the dining room passed by an embroidered picture of General Walker, and later this picture was brought into the dining room and placed back of the head table (see page 104). Dr. Rowe stated that several years ago a group of Chinese students at Technology felt that they should present to the Institute some kind of gift to express in a simple manner their gratitude toward us for their education. This idea met with instant approval among all the Chinese alumni. A fund was collected and it was decided that the gift should be an embroidered picture of President Walker. The Technology Club of Shanghai was asked to take care of the embroidery.

Reference was made to the recent deaths of three notable alumni: John R. Freeman, '76, who was President of the Alumni Association from 1897 to 1899, and who had for many years been Secretary of his Class; Frederick H. Newell, '85, who was President of the Alumni Association in 1903; George K. Burgess, '96, who as President of the Technology Clubs Associated for the past few years had been Vice-President of the Alumni Association. The President was instructed to appoint committees to prepare suitable resolutions.

The salad oration at this meeting was delivered by Dean Lobdell. He spoke briefly on the trip taken by him and Mr. Killian this summer to Technology outposts in the West.

Salary Reserve Fund

A COÖPERATIVE plan, whereby the staff and employees of the Massachusetts Institute of Technology have undertaken to lay up a reserve against a possible deficit in case the year's income is reduced below present expectations, was announced by President Karl T. Compton following a meeting of the Faculty on November 9.

(Concluded on page 114)

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INSTITUTE GAZETTE

(Concluded from page 112)

President Compton stated that the Institute's budget is now balanced, but that this action has been taken to create a reserve which may be drawn upon in case income from endowments should fall appreciably below the figure indicated by the present dividend rates.

This salary reserve fund is to be set up from two sources. The first source is the "Professors' Fund," which has been accumulating for more than a year from the 50% contributions of income earned by members of the staff for professional services rendered to parties other than the Institute during the terms of the Institute session. The professors themselves have voted that this fund shall be used to set up a plan for leaves of absence to enable members of the Staff to increase their professional contacts and opportunities for research. They have, however, now voted to put such portion of this fund as may be required at the disposal of the Institute for meeting its operating expenses in case these should exceed the income for the year.

The second source of funds consists of a deposit of 10% of salaries or wages, after deducting an exemption of \$500, to be accumulated between December 1, 1932, and July 1, 1933, with the understanding that any balance of this fund which may not be needed in meeting the operating expenses of the Institute shall, on July 1, be returned *pro rata* to those who have contributed to it.

President Compton emphasized that this is a precautionary measure to prepare for contingencies which are not now in sight and which it is hoped will not arise. Prudence demands, however, that such precautionary measures be taken in order effectively to meet the situation if it should be necessary.

There has been no reduction in salaries at Technology and this action is not considered as a reduction. The Corporation has made every effort to maintain salaries on the present basis, especially in view of the fact that the outside income of the Staff, through various professional contacts, comes from a type of work which is very greatly reduced during the times of business depression. The Staff as a whole has already suffered a very considerable reduction in income from such work, even though the Institute salaries have remained unchanged.

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M. I. T. NEWS BULLETIN

PREPARED BY JOHN J. ROWLANDS, DIRECTOR, INSTITUTE NEWS SERVICE

President Compton's Report

Progress and developments at Technology during the past year were discussed by President Compton in his annual report, which was presented to the Corporation at its regular meeting at the Institute on October 19.

The report, covering the year ending October 1, discussed possibilities for effective administration under the new plan of organization. This plan, which was announced last spring, divides the Institute for administrative purposes into five parts designated as the School of Engineering, the School of Science, the School of Architecture, the Division of Humanities, and the Division of Industrial Coöperation. Under the latter all coöperative services to industry are consolidated, and the division will have a representative and sub-committee in each department of the Institute.

President Compton drew attention to an important change in the plan of instruction, providing a greatly simplified course of study in the second year. This carries a step further the readjustment of curriculum which was started two years ago with similar unification of studies in the first year.

In the present plan all students take the same course in basic science and English during the first year. This is followed by additional basic science, English, and history with minor introductory courses in the various departments in the second year. By this change it is unnecessary for the student to make his final choice of course of specialization until the beginning of his third year. An exception to these arrangements is found in the School of Architecture, for which a special course of study from the beginning has appeared advisable.

A faculty committee is now engaged in a thorough study of the upper-class program of instruction, from the very fundamental point of view of ascertaining how a course of study can best be set up to meet the present and future needs of society. It is hoped that results of this study may be available during the coming year.

The staff of the Institute has made notable contributions to the relief of unemployment and its accompanying evils in two distinct ways, the report stated. In the first place, its members have voluntarily conducted free courses in professional and humanistic subjects. Last winter courses were given to a total enrollment of 460 for the principal purpose of providing opportunities for unemployed professional men to improve their professional status through further study and acquaintance with the

most recent developments in their field of interest. These courses are being continued this year.

In the second place, a fund of several thousand dollars was voluntarily contributed by the members of the staff and was used to give employment to any Technology graduates whose economic situation made necessary this plan.

Work was found in a great variety of Institute activities, which were of definite value to the Institute but which would not otherwise have been carried on. The jobs included construction of equipment, work as mechanics or research assistants, improvement of grounds and buildings, and services as draftsmen and computers. Every graduate who applied for such work was taken care of. A total of 41 men were employed with these funds, and several obtained permanent or semi-permanent positions through this connection. The plan is being continued this year.

Financial assistance to students during the past year amounted to \$327,943, which included loans from the Technology Loan Fund totaling \$178,672 to 495 students. Indications are that loans this year will be considerably in excess of these figures.

The careful attention given to the health of students and members of the staff by the Department of Hygiene was indicated in the President's report by figures for the past year. In a Technology community of approximately 4,000 individuals there were but 221 medical, and 82 surgical cases treated at the Homberg Infirmary. Only four cases of contagious disease were recorded during the entire year.

A distinct improvement in scholarship among Institute students was noted during the year, the report stated. This was attributed by President Compton to the beneficial operation of a new numerical rating system, increasingly selective admission of students of high promise, and a certain sobering influence of the present economic situation.

As a result of a survey of plans of admission the Faculty has voted for a trial period to admit a limited number of students without examination, provided they have graduated in the upper fifth of their class in an accredited secondary school, and can enter with a clear record in all subjects required for admission. This alternative plan of admission, the report states, will afford relief to certain schools or students not favorably situated for special preparation to meet College Entrance Board examinations.

The regular work of the Employment Secretary of the Technology Christian Association has taken on added signifi-

cance during the depression. Through his office there have been made during the past year 479 placements of 291 individuals, with offerings of 338 positions. These have led to aggregate earnings of \$52,010. The individual earnings range from \$1.00 to \$1,400, with an average of \$178.72 per man.

Graduate Employment

Approximately 30% of the Class of 1932 obtained employment upon graduation last June, according to recent estimates made for *The Tech* by Colonel Frank L. Locke '86, Personnel Director of the Institute.

Of Technology's total of 22,000 registered graduates, 900, or less than five per cent, are now listed by the Personnel Bureau as unemployed. One-third of this relatively small group represent men who graduated prior to 1920.

Athletics at Technology

The importance of athletics for the health of students and suggestions for future additions to the facilities for sports at the Institute were discussed by Dr. Allan W. Rowe '01, President of the Alumni Association and Secretary and Treasurer of the Alumni Advisory Council on Athletics, at the recent meeting of the Corporation.

Dr. Rowe has long been identified with the development of athletics at Technology, to which as a charter member of the Advisory Council on Athletics he has given much time and thought.

Sports at Technology are carried on at an annual gross expenditure of approximately \$65,000, of which half comes from the Institute, while the remainder represents the student contribution from its various sources of income. This sum provides athletic activities for fully half the student body, with 34 varsity and class teams. Dr. Rowe said that at no time has there been an operating deficit in athletics at the Institute, and that in the past ten years an appreciable sinking fund of several thousand dollars has been accumulated against future contingencies.

Turning to the needs of the future, he expressed the belief that the athletic program constitutes a necessary and highly valuable portion of the general educational plan. Describing the present athletic facilities and equipment as inadequate for the growing demands upon them, he voiced the hope that, when economic conditions improve, it may be possible to provide a new gymnasium building for the benefit of future generations of students. The need for a new boathouse was also discussed, and Dr.

Rowe explained that upon expiration of the lease on the present building some ten years hence, it will be necessary to find new quarters.

In paying high tribute to the work of the Department of Hygiene which supervises the health of students at Technology, Dr. Rowe said that he hoped that it may be possible in the future to supplement it with the addition of other workers, specialists in fields peculiarly concerned with the problems of student health. He outlined the possibilities open to the Institute for the organization of scientific study in methods of correction of defects and maintenance of health among students. Such investigations, he thought, would be particularly interesting in connection with the participation of young men in sports.

Faculty Club Dinner

President Compton and Dr. Harlow Shapley, Life Member of the Institute Corporation, were the speakers at the annual dinner of the Faculty Club held at Walker Memorial on the evening of October 20.

Dr. Compton discussed the summer meeting of the Society for the Promotion of Engineering Education which he attended last June in Corvallis, Ore. Dr. Shapley spoke on "Highlights of the Recent Congress of the International Astronomical Union." Dr. Murray Horwood '16, President of the Faculty Club, presided at the dinner.

Tribute to a Mother

Honorary college degrees are symbols of recognition of high achievement in various walks of life. For their contributions in education, science, business, and industry many men and women have thus been honored. Few academic distinctions, however, have the rich significance of the honorary degree of Doctor of Laws which on October 11 was conferred upon Mrs. Elias Compton, mother of President Compton, by Western College for Women.

Mrs. Compton was graduated from the college in 1886, and it was at the annual college day exercises at Oxford, Ohio, that this tribute to her achievement as a wife, a mother, a friend of youth, and a servant of the church was made.

In commenting upon this distinction to one of the mothers who have done much to enrich the history of the country, the *Boston Herald* in an editorial said:

"Mrs. Compton is the mother of that great triumvirate: Karl Taylor Compton, president of the Massachusetts Institute of Technology; Arthur Holly Compton, the brilliant physicist who won the Nobel prize in 1927; and Wilson Martindale Compton, economist and general manager of the National Lumber Manufacturers' Association. As the wife of Elias Compton,

now an emeritus member of the faculty of the College of Wooster, she has made her home in that town for 40 years, investing her influence not only in the formation of the character of her children but in the promotion of high thinking and cultured living. Oxford is the seat of Miami University, founded in 1809, and of the Woman's College, established in 1853, a center not unworthy of the English name it bears.

"One may wonder when, if ever before, such an honor has been bestowed upon a woman for her shining success in the highest of all the responsibilities of womanhood. Mrs. Compton might qualify upon other grounds for college honors. But the nation is now reminded dramatically of the meaning of the American home and the American family. What must be the feelings of the three sons as they witness the citation of their mother for this doctorate!"

Textiles

Professor Edward R. Schwarz '23 of the Department of Mechanical Engineering was a speaker at the all-day session held by members of the Textile Section of the American Society of Mechanical Engineers at the Institute on October 27. In a paper entitled "Textiles as They Are," Professor Schwarz discussed the microscopical examination of textile materials.

The day's program included a tour of inspection through the Institute laboratories and a luncheon in Walker Memorial. The afternoon session was devoted to the presentation of technical papers.

Registration

On November 1 there were registered at Technology a total of 2,831 students, a decline of 357 from the total for the same date last year. This decrease of 11% was anticipated and is close to an estimate made by Registrar Joseph C. MacKinnon last spring.

Registration decreases are general throughout the country and are attributed to economic conditions, which are now affecting the financial resources of a large group whose incomes during the first and second years of the depression were not seriously depleted.

A study of registration by years shows that the entering class, with a total of 561, has declined 67 from last year. Second-year enrollment is 184 under 1931, and there are 13 less juniors registered. A decrease of 47, or approximately eight per cent, is shown in the senior class. In the graduate group there are 46 less students than last year.

The freshman class this year includes about 100 students admitted under the new plan permitting the entrance of men

who have maintained a standing in the upper fifth of their classes in accredited preparatory and high schools.

Free Courses for Unemployed

Free courses for engineers and architects now out of employment are being offered again this year at Technology. The plan was started in the autumn of 1931, when more than 200 men in various fields of engineering and architecture registered for the courses.

These courses are given by members of the Institute faculty, and are intended for engineers and architects of Greater Boston whose qualifications enable them to carry on the regular work at Technology. Several courses opened on October 20, while the others started the following week. To carry on this work President Compton appointed a committee of which the members are Professor Charles F. Park, Chairman, Registrar Joseph C. MacKinnon, and Professor Carroll W. Doten.

Faculty Club

Alden G. Alley, Professor of History at Dana College, addressed members of the Faculty Club at their regular luncheon meeting on October 26. Professor Alley, who for a number of years has been both a teacher and student of international affairs, spoke on "Europe's Recovery and Ours."

Reviving the custom of inviting as speakers members of the Institute staff who have recently returned from leave, the Faculty Club on October 31 heard Professor Otto G. C. Dahl '21, of the Department of Electrical Engineering, Dr. Norbert Wiener, Professor of Mathematics, and Professor George Scatchard, of the Department of Chemistry.

As Guggenheim Fellows, Professors Dahl and Scatchard spent the past year in advanced research in Germany, England, and Scandinavia. Dr. Scatchard investigated the theory of liquid solutions, while Professor Dahl made studies of electric power transmission. Dr. Wiener lectured on Fourier series last year at Cambridge University and several German schools.

Chute à Caron Dam

James W. Rickey, chief hydraulic engineer of the Aluminum Company of America, on October 20 addressed members of the Technology Student Chapter of the American Society of Civil Engineers on "The Chute à Caron Hydraulic Development."

Mr. Rickey described the damming of the swift Saguenay River in Quebec by building a huge concrete dam in the form of an obelisk and tipping it into place by blasting.

ADVERSARIA

Retired

¶ WILLIS R. WHITNEY '90, from active service as Director of the General Electric Research Laboratory, the "House of Magic," owing to poor health. Dr. Whitney organized this laboratory and has been its Director for 32 years, the first work of the laboratory being done in an old barn, then used by the late Charles P. Steinmetz. After graduation Dr. Whitney was associated with the Institute's Department of Chemistry until he entered the General Electric Company in 1900, and since 1904 he has been non-resident Professor of theoretical chemistry. Dr. Whitney is to continue as Vice-President in charge of research and Dr. WILLIAM D. COOLIDGE '96, Senior Associate Director of the laboratory, will succeed him. Dr. Coolidge is known to scientists for his work with drawn tungsten and high-power electronic and x-ray tubes.

Congratulations

¶ TO FRANK P. MCKIBBEN '94, on his election to the Presidency of the American Welding Society at its annual meeting in New York in June. (See class notes for further account.)

¶ TO GERARD SWOPE '95, for being presented with the gold medal of the National Academy of Social Sciences, on May 12, at New York City, in recognition of his constructive social services, including his plan for dealing with stabilization of employment, and for his work at Greenwich House, well-known social center. Mr. Swope was commencement speaker last June at Bryn Mawr College, and on June 7 was awarded the degree of Sc.D. by Washington University. He was also presented with the Manufacturers' Medal for 1932 at the annual dinner of the National Electrical Manufacturers Association on September 26, for his work in behalf of the stabilization of industry.

¶ TO E. SHERMAN CHASE '06, on his election as one of the Vice-Presidents of the New England Water Works Association.

¶ TO JOHN A. ALLAN '12, this year's President of the Canadian Mining Institute, on his election to honorary membership of the Chemical, Metallurgical and Mining Society of South Africa for 1933.

¶ TO WARREN J. SCOTT '18, on his appointment as one of the directors of the N. E. W. W. A.

¶ TO KENDALL PRESTON '21, on his election to the Vice-Presidency of Anderson and Cromwell, investment counsellors, of Boston.

¶ TO MARY ANN CRAWFORD '29, on her election as President of the Women's Architectural Club at its recent annual meeting in Chicago.

¶ TO WILLIAM R. PERRET '30, for being awarded a Charles A. Coffin Foundation

Fellowship by the General Electric Company. He will do research work at M. I. T. on electronics.

R. F. C. Engineers

¶ Among the 37 well-known engineers who have been asked by the R. F. C. to act as advisers to its local loan agencies in the consideration of self-liquidating projects for which loans are asked are the following Technology engineers: GEORGE W. FULLER '90, New York; ALONZO J. HAMMOND '91, Chicago; ROBERT H. FERNALD '94, Philadelphia; and OSCAR G. THURLOW '04, Birmingham. It is the opinion of the directors that by having these engineering advisers on the staff of their local agencies, the need for adequate engineering work can be impressed upon the applicants, who might otherwise send applications to Washington without complete supporting data of an engineering nature.

Boston Engineering Societies

¶ The November issue of the *Journal* of the Engineering Societies of Boston brings to light the activities of a goodly number of Technology men. We note, for instance, that: Professor W. H. Timbie is vice-chairman of the Boston Section of the A. I. E. E. for 1932-33 and is also chairman of the Student Relations Committee; GEORGE A. PACKARD '90 is chairman and FRANKLIN L. FOSTER '25 is Secretary of the Boston Section of the A. I. M. M. E.; WILLIS C. LUCE '29 is Secretary-Treasurer of the Boston Chapter of the American Association of Engineers; HAROLD K. BARROWS '95 is President of the Northeastern Section of the A. S. C. E. and he and EDWARD H. CAMERON '13 are councilors; the standing committees of the Engineering Societies of Boston include: HAROLD K. BARROWS '95, Federal Government Affairs; HARRISON P. EDDY, JR., '17, Finance; EDWARD H. CAMERON '13 and FRANK A. MARSTON '26, Employment Service; EDWARD E. BUGBEE '00, Licensing Engineers. In this *Journal* there also appeared a report by HAROLD K. BARROWS, as chairman of the Committee upon Governmental Relations, on "The Reconstruction Finance and Massachusetts Projects."

Written

¶ By JASPER WHITING '89, a book of original charades entitled "Cut Off My Head," published this fall by Bruce Humphries, Inc.

¶ By HAROLD W. JONES '98, an article entitled "One Thousand Spinal Anæsthesias," which appeared in the *Annals of Surgery* in July and was originally read before the Association of Military Surgeons of the United States, November

30, 1931. Dr. Jones is a surgeon of the Medical Corps, U. S. Army, and is located at the station hospital at Fort Sam Houston, Texas.

¶ By BRADLEY JONES '10, a book entitled "Air Navigation." Mr. Jones is in charge of the Department of Aeronautical Engineering at the University of Cincinnati.

¶ By F. ALEXANDER MAGOUN '18, and his students, "Problems in Human Engineering," published this fall by the Macmillan Company. The book has its origin in the course in Humanics at M. I. T., of which Professor Magoun is in charge. The course was instituted by the late WILLIAM E. NICKERSON '76, who was interested in teaching engineers how to handle men and situations requiring more than mechanical ability. The book points out what The Review has often noted that at least 75% of the men trained in engineering find themselves in administrative work. The principle on which the course is founded is: "If a student can be taught quantitative analysis, differential equations, and the quantum theory, it should be equally possible to teach him the fundamentals of understanding human nature and to make him sensitive to the lessons of experience."

¶ By ALLEN ORTH '26, in collaboration with Charles F. Kettering, a book entitled "The New Necessity," published by Williams and Wilkins.

Presented

¶ EARL B. MILLARD, Professor of Theoretical Chemistry and Assistant Director of the Division of Industrial Cooperation, a paper on "What Organized Scientific Research Can Do for the Textile Industry," at the annual meeting of the U. S. Institute for Textile Research in New York City, on November 3.

¶ SANFORD E. THOMPSON '88, before the midwest fall conference of the Society of Industrial Engineers in Chicago, September 9, a paper on the "Scientific Development of Banking and Credit."

¶ WILLIS R. WHITNEY '90, and PHILIP L. ALGER '15, in cooperation with F. D. Newbury, a paper on "Development of Electrical Machinery in the United States," at the International Electrical Congress in Paris, July 4-12.

¶ WILLIAM D. COOLIDGE '96, with E. E. Charlton, a paper on "Modern X-Ray Tubes and High Voltage Generators; and also with C. N. Moore on the subject, "Experimental Study of Cathode Rays Outside the Generating Tube," at the International Electrical Congress in Paris.

¶ JOSEPH W. BARKER '16, an address on "Planning for the Future," at the first meeting of the New England Section of the Illuminating Engineering Society held on November 3. Mr. Barker is Presi-

dent of the I. E. S. and a former chairman of the New England Section. In 1925 he joined the staff of the Institute as assistant, later becoming a professor. Several years later he became Head of the Department of Electrical Engineering at Lehigh University and today he is Dean of Engineering at Columbia University.

¶ HARRISON P. EDDY, JR., '17, a paper before the 13th conference of the International Association of Public Works Officials held in Pittsburgh, September 29 to October 1.

¶ VICTOR O. HOMERBERG '21, a paper on "Nitriding — Latest Developments Here and Abroad," at a meeting of the Providence section of the A. S. M. E., November 2.

¶ DANIEL C. SAYRE '23, an address at the luncheon meeting of the Rotary Club of Boston, November 2, at the Hotel Statler, on "My Daily Meteorology Observations 17,000 Feet Over Boston." Mr. Sayre was presented by Colonel Frank L. Locke '86, an honorary member of the club. Mr. Sayre is a contributing editor to *The Review* and presented an article in the issue of last May on his meteorological flying.

¶ PHILIP K. BATES '24, a paper on the subject of food preservation, illustrated with slides showing the results of numerous experiments, at the October meeting of the American Society of Refrigerating Engineers.

¶ KENNETH C. REYNOLDS '25, a paper on "A Freeman Traveling Fellow and the New Hydraulics," at the meeting of the Providence section of the A. S. M. E., November 1.

¶ MAHLON L. HENDERSON '27, with C. A. Nickle, a paper entitled "Short Circuit Torques" at the June meeting of the A. I. E. E.

In the News

¶ FRANKLIN W. HOBBS '89, as chairman of a symposium on "scientific research in progress and planned," at the annual meeting of the U. S. Institute for Textile Research in New York City.

¶ PIERRE S. DU PONT '90, for heading the list of millionaire life insurance policy holders with a total of \$7,000,000. The list consists of more than 400 prominent persons.

¶ A. FARWELL BEMIS '93, for having contributed \$65,500 toward the restoration of Lincoln Cathedral in England. At the reopening service many tributes were paid to American generosity for helping to restore this unique cathedral, which possesses every architectural style known in the country, from Norman to the Renaissance work of Wren.

¶ HAROLD S. BOARDMAN '96, President of the University of Maine, on his appointment as chairman of a committee of nine to study the effect of the depression on the land grant colleges and universities.

¶ OSWALD C. HERING '97, mentioned by John Clair Minot in the *Boston Herald* of October 15, for his excellent work as editor of the *Delta Kappa Epsilon Quarterly*, now celebrating its golden jubilee.

¶ THOMAS L. HINCKLEY '06, former Head of the Department of Municipal Research at M. I. T., for the survey of local city government he is undertaking. (See class notes for account.)

¶ HOLDEN C. RICHARDSON '06, as head of the Commission making a report on the Labrador, Greenland, Iceland route, in the *Geographical Review*. The report gave strong confirmation of the feasibility of the northern North Atlantic route for airline use.

¶ ROYCE W. GILBERT '09, of Chase and Gilbert, Inc., Boston, engineers and builders, for giving an evening course of eight lectures on building construction, which began October 20, under the auspices of the State Department of Education's University Extension Division. (See class notes for further account.)

¶ BERNICE E. HUTCHINSON '09, Vice-President of the Chrysler Corporation and chairman of the Board of the Plymouth Car Company, who is to give a lecture on "The Automobile Industry," December 13, this being the first of the Cyrus Fogg Brackett Lecture series of 1932-1933, at Princeton.

¶ RALPH B. KENNARD '13, for having enlisted, with 14 others, to teach without salary in a new poor boy's college recently proposed by a group of educators out of employment. The college will be at Port Royal, Va., and is designed to bring together experienced teachers who are without positions and students who, because of financial stringency, are unable to continue their courses in existing institutions.

¶ HERBERT A. BARNBY '23, with E. W. Fuerst, for having made the most important developments in the business of the Owens-Illinois Glass Company during the depression. They perfected the process and machinery for the vacuum packing of coffee in glass and developed a new process for packing tomato juice in glass. Mr. Barnby assisted in the Department of Chemistry at the Institute, later was associated with the Continental Baking Corporation, and was for five years in charge of the chemical works of the Glass Container Association before taking his present position with the Owens-Illinois Company. Design, the company claims, has become more than an art problem so that this feature of service has become a part of the new uses and research division.

Books by the Million

¶ SIDNEY M. BIDDELL '22, is confident he can sell 5,000,000 books this year. Already he holds the record of selling 2,000,000 books in two years and, by mass production methods, intends to lower the cost of books to meet everyone's pocketbook. After graduating from M. I. T. he went to work for Payson and Clarke, New York publishers, becoming Vice-President in charge of sales. Then the mass production idea occurred to him and he sold his collection of first editions for \$5,000 and went into the venture under contract with the United Cigar Stores. His theory has become a proven fact. Now he plans to market a

new book every week through 70,000 stores and magazine shops at 50 cents a book. They are to be written by well-known authors and will cover many fields of literature. In 1920 Mr. Biddell was a member of the United States swimming team at the Olympic games in Antwerp.

In the Public Eye

¶ PAUL H. HSU '14, whose distinguished career is noted at length in *The China Weekly Review* (an independent journal of opinion published in English), under the heading "Who's Who in China." Mr. Hsu was the first Chinese graduate to be appointed assistant on the Institute staff, being with the Department of Chemistry from 1914-1916. Until 1921 he worked in this country, leaving at that time to become superintendent of the International Soap and Drug Works in Shanghai. He is considered the best soap and oil expert in China. His interests have led him into educational and political work of many kinds, too many to enumerate here. His club activities make an equally imposing list, but of particular interest here we mention that he has been President of the Technology Club of China, three times President of the Chinese Engineering Society, director of the Chinese Institute of Engineers and President of its Shanghai Branch, and chairman of the delegation of the Chinese Engineering Society to the World Power Conference and the World Engineering Congress at Tokyo, 1930. He is at present educational commissioner, City Government of Greater Shanghai.

Recent Deaths

¶ ELBRIDGE S. CARLETON '87, at West Wardsboro, Vt., on October 10.

¶ LEON M. ABBOTT '89, in Brookline, on October 10.

¶ ARTHUR L. DAVIS '89, in Atlantic City, October 19, while on his vacation.

¶ GEORGE F. RUSSELL '89, on September 29, of a heart attack.

¶ WILLARD L. BOWKER '90, on September 18.

¶ ADOLPH LOMB '93, Vice-President of Bausch and Lomb Optical Company, on September 30, of pneumonia.

¶ HARRISON W. HAYWARD '96, professor of materials engineering at the Institute, on October 18. (See class notes for account.)

¶ WILLIAM F. SMART '05, in Lewiston, on September 12. (See class notes for brief account.)

¶ WILLIS RANNEY '07, on July 16. (See class notes for account.)

¶ DOUGLAS CAIRNS '08, after several months of illness, on October 6.

¶ MAURICE W. SALOMONSON '13, in Newtonville, on October 7.

¶ SIDNEY POWERS '13, geologist and an official of the Amerada Petroleum Corporation, on November 5.

¶ GORDON WAYNE '24, on June 6.

¶ JOSEPH G. DALTON '24, in Charlottetown, Canada, date unknown.

¶ FRANK P. SPROUL '31, on November 6.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

The Technology Club of Rochester

During the past year the Club has held several meetings. That of May 18 at the University Club was marked by the presence of Dr. Vannevar Bush, Vice-President of the Institute. He described the new organization at M. I. T. and pointed out that the need for such an arrangement had been forced upon M. I. T. due to its growing complexity and the resulting strain upon its single executive in the past. The financial condition was reported to be sound, such retrenchments as had been necessary being accomplished with the minimum of hardship to those concerned. The new admission requirements were described along with the success of the student loan plan. The talk was followed by a period of enthusiastic questions regarding various activities at Technology. The Club was indeed fortunate in having Dr. Bush at this meeting.

The following accomplishments are of interest: a new, and as far as possible complete, directory of M. I. T. men in the vicinity of Rochester was compiled under the direction of Henry R. Couch '20. This list gives, as of July 1, an alphabetical list of names followed by addresses and occupations; the contribution to the M. I. T. A. A. was maintained and, due to the exigencies of the situation, an additional sum of \$25 was included; the Scholarship Committee, under John F. Ancona '03, reported success in raising an amount necessary to provide one year's tuition at M. I. T.; D. B. Kimball '20 and his Committee were on hand at the annual college night for Rochester High Schools. This event is held for the purpose of allowing potential college students an opportunity of meeting representatives of the various schools which they may wish to attend, and fills a very definite need through the information provided.

The annual meeting was held October 1 at the home of William W. Vicinus '23, Durand Eastman Park, Rochester, N. Y. This was the same grand good time that Bill always manages to arrange. Sandwiched in with the fun, the Club transacted a certain amount of business. The contribution to the M. I. T. A. A. was voted. The Freshman Scholarship will be maintained. The following men were elected officers of the Club for the coming year, 1932-1933: President, Sydney Alling '11; First Vice-President, William W. Vicinus '23; Second Vice-President, Charles K. Crofton '22; Treasurer, Andrew Langdon '22; Secretary, Laurence T. Tufts '29; Executive Committee, Hazen C. Pratt '22 and Kenneth J. MacKenzie '28. — LAURENCE T. TUFTS '29, *Secretary*, Kodak Park, Building 26, Rochester, N. Y.

M. I. T. Association of Buffalo

The annual outing was held with much gusto on the Canadian shore of Lake Erie on the afternoon of September 17. Curtiss Aeroplane carried off the prize for the largest delegation with a baseball team of nine men. Soft ball, horseshoes, cards, and swimming were enjoyed as long as anyone could see.

On October 5, during the National Metal Congress and Exposition, which was held in Buffalo, an M. I. T. luncheon was attended by about 20 visiting alumni and the same number of local men. Dr. Waterhouse, from the Department of Metallurgy, who was attending the convention, was present and answered numerous questions concerning recent activities at the Institute. — CLAYTON D. GROVER '22, *Secretary*, 319 Niagara Street, Buffalo, N. Y.

New Haven County Technology Club

The annual meeting of the New Haven Technology Club was held on the evening of October 8. The meeting started with a dinner at which 17 members of the Club were present. The announcement of the results of the ballots for the officers for the following year were: President, Charles E. Smith '00; Vice-President, Professor Hudson B. Hastings '07; Secretary, Marshall S. Wellington '16; Treasurer, Wesley T. Jones '11; Governor-at-large, Stuart M. Boyd '18.

Professor O. Glen Saxon of the School of Business Administration of Yale University gave a very interesting talk on "International Trade." The meeting was then thrown open to discussion. The members next moved to the bowling alleys, where several very interesting games were rolled. — MARSHALL S. WELLINGTON '16, *Secretary*, 60 Holcomb Street, West Haven, Conn.

M. I. T. Club of Northern California

No meetings of this organization have been held since the picnic at Inverness reported last month. The program for an evening meeting in the near future, however, is taking shape, and one of the features will be moving pictures taken by some of our members and recording the activities at Inverness.

Regular Tuesday luncheons are still held at the Engineers' Club, Pine and Sansome Streets, San Francisco, and a fairly representative group of alumni is always present. Interesting discussions invariably arise, and those who attend always feel that the time was very well spent. All Technology men are welcome. — ROLFE A. FOLSOM '18, *Secretary*, 150 Hooper Street, San Francisco, Calif.

The M. I. T. Club of Western Pennsylvania

Dr. Vannevar Bush, Vice-President of the Institute and Dean of Engineering, will be the guest of the Club at its first monthly dinner meeting to be held Thursday, November 3.

On Wednesday evening, Dr. Bush is scheduled to give a talk to the Westinghouse Club. On Thursday noon the Club will hold a special luncheon for Dr. Bush at the University Club, which will be attended by Chancellor John D. Bowman, of the University of Pittsburgh, Dean E. A. Holbrook '04, of the University of Pittsburgh, and Dr. Thomas S. Baker, President of Carnegie Institute of Technology.

The executive committee of the club has met and planned a full schedule of gatherings for the year's activity.

Milton Dobrin of Pittsburgh has been awarded the regional scholarship upon recommendation of the Club and is now at the Institute pursuing his studies. — CHARLES M. BOARDMAN '25, *Assistant Secretary*, Duquesne Light Company, Pittsburgh, Pa.

Technology Club of Milwaukee

The Milwaukee Club held its first meeting of the season on Tuesday, October 18. There were ten men present, a good average number for one of our meetings. The meeting consisted of the usual dinner, followed by an evening of informal discussion. It was decided to continue these regular monthly dinners during the coming season just as they have been held during the past two years. At this last meeting Erling S. Mathiesen '29, was elected Secretary-Treasurer of the Club. — ERLING S. MATHIESEN '29, *Secretary*, 1440 North 39th Street, Milwaukee, Wis.

M. I. T. Association of Baltimore

The M. I. T. Association of Baltimore is still progressing as a result of the re-awakening given it by Colonel Locke a year ago. We have been holding weekly luncheons, even through the summer months, and a special evening dinner meeting was held on October 3 to start the ball rolling for the fall and winter campaign. — GEORGE W. SPAULDING '21, *Secretary*, 1611 Lexington Building, Baltimore, Md.

CLASS NOTES

1876

In the death of John R. Freeman, which occurred on October 6, the Class has lost the only Secretary it has ever had and the only member of the Class who

1876 Continued

has consistently tried to hold its members together. Because of the dearth of news in recent years and the wide activity of our late Secretary, there has been only scattering news of the Class.

It is now 60 years since we started on our course at M.I.T. Freeman, by chance, was one of the first men I became acquainted with. After graduation we were separated for four years and then for about three years we lived together and after that, through these many years, our intimate relations have been unbroken.

I have known a good deal about his professional work, his interest in engineering, in educational work, in work for his community and for the country. No man whom I have known has had more or broader interests, and no one has worked more intently and for longer hours than he, and it was only because of his rugged constitution and some attention to his physical condition in recent years that the machine had not worn out long ago.

No graduate of Technology has shown a greater interest in its problems and welfare than Freeman. At the time of his death he was second in length of service as a Life Member of the Corporation. He took this office in all seriousness and performed all the duties which were involved in the office as critic and helpful advisor and contributor of money and time.

He has endeavored to keep in touch with our classmates regarding their families, occupation, their successes and disappointments, and to give them cheer and material assistance when needed.

A recital of his achievements has appeared in another part of *The Review* (November, page 64) and in the transactions of many professional bodies. These are all gratifying, but it is the human side of his life which is of greater interest to his few remaining classmates and the characteristic which they will cherish the most. — CHARLES T. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass.

1882

From the *Boston Globe* of August 30 we read the following item of interest concerning our youngest class member who recently completed a long and faithful service to the Commonwealth of Massachusetts.

A man who entered State service nearly 50 years ago will retire with the close of business tomorrow night. He is Director Charles D. Jenkins of the Utilities Department's bureau of gas, electric and water utilities.

Although threescore and ten, Mr. Jenkins still enjoys excellent health and his faculties are as alert as ever. He has had to do mainly with the examination of meters, of the quality of gas supplied by the 50-odd gas companies, the accuracy of the gas meters used by them, the public relations of the gas and electric companies, the extension of service, and the quality of service by these utilities as well as of the private water companies.

Governor Long appointed Mr. Jenkins in 1882 as assistant inspector of gas and gas meters, his chief then being Major

Charles W. Hinman '70, successor of William Barton Rogers, founder of M. I. T., in that important post. Its headquarters were then in Hawley Street. From Governor Long's time until the term of Governor McCall, when Mr. Jenkins' office was put under Civil Service, all 15 intervening Governors had steadily reappointed Mr. Jenkins for three-year terms.

When electricity took first place away from gas in the lighting field, the gas companies began their invasion of the heating field. This shift forced some pioneering technical work upon Mr. Jenkins, and the ability with which he met changed conditions is attested today by the department's standardized requirements, and by improved relations between producer and consumer.

Mr. Jenkins was born in South Boston 70 years ago, grandson of Joshua Jenkins, founder of the old Suffolk Glass Works, whose disused plant at the foot of Mercer Street was destroyed by fire in 1900. His own father had conducted the plant for a time. Graduating from Andrew Grammar and English High Schools, Mr. Jenkins received his degree at Technology in 1882.

After working a week for a New Jersey concern, following his graduation, Mr. Jenkins returned again to Boston, and Governor Long shortly appointed him to State service. He and Mrs. Jenkins are to remain at their Scituate home until late in the fall. Mr. Jenkins' hobbies are his five grandchildren, and outdoor photography. His son is Captain L. Dean Jenkins of Portland, Maine, active in American Legion circles there. Jenkins' address for the present is First Parish Road, Scituate Center, Mass. He writes: "You know the rain seems quite important to those of us close to nature. Mrs. Jenkins is a city girl and finds the country irksome; I like the country, especially when nature is doing things, raining, snowing, flowers blooming, and so on. So I enjoyed the fall weather you referred to and we are both happy." — ALFRED L. DARROW, *Secretary*, 39 Garrison Road, Brookline, Mass. RACHEL P. SNOW, *Assistant Secretary*, 52 Leighton Road, Wellesley, Mass.

1884

Some of us who used to visit the Mechanic Arts Shops may remember Solomon F. Cushman of Monson, who died there on September 1. He was born October 7, 1862, in Monson and was educated at the local Academy, the Lowell School of Practical Design, and the M. I. T. School of Mechanic Arts. Upon returning to Monson he became associated with his father and brothers in the woolen business as a member of the firm of S. F. Cushman and Sons, being in active charge of the branch mill in South Monson for a number of years. He retired from the woolen business in 1912 when the manufacturing property was sold to Heimann and Lichten Company.

In 1902 a unit of the Boys' Brigade of America was organized under Mr. Cushman's direction. He was commandant for its four years of existence. In later years he had served on the Advisory Board of

the Monson Boy Scouts. He had been a member of the Republican Town Committee and a Director in the National and Savings Banks of his native town. In 1889 he married Helen A. Hussey of Monson, who died in 1922, and is survived by two sons, a daughter, and two grandchildren.

Note by the Secretary: I find that Cushman graduated from the School of Mechanic Arts, M. I. T., in 1882, consequently he should be considered to be in that class rather than of 1884, as it now stands in the Alumni Register. — AUGUSTUS H. GILL, *Secretary*, Room 4-053, M. I. T., Cambridge, Mass.

1888

The following account appeared in the *Boston Transcript* of September 30. Miss Dudley was a member of our Class in our freshman year, specializing in chemistry.

"News has come from Geneva, Switzerland, of the death there on September 29 of Miss Helena Stuart Dudley, who, during a period of years in Boston, was closely identified with the work of Denison House at 93 Tyler Street, where she became a powerful factor in the various departments of social welfare activities. She was in her 75th year.

"Miss Dudley spent most of her early life in Colorado and other places in the West. She attended the M. I. T. in 1884 and then entered Bryn Mawr in 1885, where she was graduated with the Class of '89. Following her graduation she taught for a time at Packer Institute in Brooklyn, N. Y., where she specialized in biology.

"In 1892 Miss Dudley was called to be the first head of Denison House and she remained there for 20 years. She became a leading factor in the Women's International League for Peace and Freedom, and was a member of the board of the Massachusetts section of the organization, traveling much abroad, especially in Germany, in the pursuance of her work. She spent considerable time at Geneva, making her headquarters at the *Maison Internationale*, where much of the work of the League was centered.

"She attended the seventh Congress of the Women's International League at Grenoble, France, and was taken ill the latter part of July while in Geneva."

The *Boston Herald* of October 13 contained the following item. All of us extend our sympathy to Ivar Sjostrom and his family. "Bruce Sjostrom, 27, the son of Mr. and Mrs. Ivar L. Sjostrom, of 429 Railroad Avenue, died today in the Lawrence General Hospital following an operation yesterday. He was associated with his father in the management of the Lawrence Dye Works. Mr. Sjostrom, who was born August 28, 1905, was graduated from the Johnson High School in 1923 and then studied at the Bradford Technical School at Bradford, England."

Elbridge S. Carleton of Rochdale, Mass., passed away at West Wardsboro, Vt., on October 10. Carleton will be well remembered by many of our classmates as he took a considerable number of courses with us, although his principal associa-

1888 Continued

tion was with the Class of '87, which will doubtless give him a more extended notice in the January issue of *The Review*.

Sanford Thompson spoke before the midwest fall conference of the Society of Industrial Engineers in Chicago, September 9, on the "Scientific Development of Banking and Credit." At this writing, two weeks before election, we understand that one of the most important questions to be settled by this election is whether Sanford or Al Smith, the "Happy Warrior," will be the head of the new Bureau of Management of Banking and Credit in the next cabinet. We can assure Sanford of the unanimous backing of the Class of '88.

Your Secretary has an explanation to make in regard to the statement in the Class Notes in the October issue of *The Review* referring to the appointment of a committee for the celebration of our Fiftieth Anniversary next June, and he will say that his error was due to one of two reasons: either he did not check his manuscript carefully before mailing, due to pressure of summer business (golf), or he thought that six summers had passed in one, due to the fact that he has had a vacation this summer six times as long as his usual summer vacation. The incident has served one good purpose, however, in calling forth a letter of inquiry from a classmate, whom we believe has never attended a class reunion, so that he should have ample time to arrange his affairs in order to be present at our Forty-fifth Anniversary, which will be held, rain or shine, somewhere on the coast of Massachusetts in June, 1933. — BERTRAND R. T. COLLINS, *Secretary*, 25 Bennington Street, Newton, Mass.

1890

Harry Burley and Allen Rogers, with their wives, took a delightful motor trip to Maine early in October. They made their headquarters at Mt. Desert, and the trip proved most enjoyable.

We regret to learn that Billy Ripley, who was in Holland to attend his son's wedding, had a sudden ill turn the day of the wedding. Mrs. Ripley immediately left Newton to join him. We trust by now he is on the road to recovery and will soon be home with us again.

Your Secretary and Mrs. Gilmore motored to the Mt. Washington House at Kearsarge, N. H., the last of August, and the day of the eclipse, thanks to Professor Thomson who tipped us off that it was cloudy there, we motored over to Bethlehem, found a break in the clouds, and sitting on the bank of the 11th putting green of the Maplewood Golf Course, had a wonderful view of the eclipse showing the corona and the diamond ring. — GEORGE L. GILMORE, *Secretary*, 57 Hancock Street, Lexington, Mass.

1894

Another summer is past, and once more the activities of the Institute are in full swing. Class news filters in little by little, and for this the Secretary is grateful. It is hoped that as each man reads the items gathered, he will be inspired to

write, dictate, or otherwise supply an account of his own activities so that in the next issue of *The Review* there may be a good grist of facts pertaining to the members who have for months past kept themselves too modestly in the background. News of travels, business, inventions, books written, grandchildren, contacts with other class members, or, in fact, any phase of activities of our class will be most gratefully received by your Secretary.

We lead off this month with the announcement of the award of the silver medal of the National Association of Cotton Manufacturers to George Haven, who, ever since his graduation, has been on the staff of the Department of Mechanical Engineering, and for the past 15 or more years has been active in the study of the problems of the textile industry. Haven now holds the title of Professor of Advanced Machine Design, and has been placed in charge of Textile Research. He has recently published an imposing volume dealing with the subject of Textile Engineering.

The award of the medal took place at the recent meeting of the National Association in Boston. At the banquet, on September 29, Haven was the guest of President Southworth, and it was on this occasion that the medal was presented, together with a certificate that the medal was awarded "for his many years of accomplishment in furthering the knowledge of the properties of cotton fiber, yarns, and cloth through the application of research, and for his preëminence as an educator and scientist in the field of cotton textiles."

The medal itself is of oxidized silver and bears the inscription "To George B. Haven, for his preëminence as an educator and scientist." The Class will share with Haven the pride which he must feel in having this honor come to him, and we hereby extend congratulations in the name of '94.

Ferdinand Schiertz recently paid a visit to the Institute, and looked up some old friends here. We believe this was the first time Schiertz has had an opportunity to see the "new" buildings, although the Institute has been in Cambridge since 1916. It was a great pleasure to show him something of the present facilities, although it was possible only to visit a few of the laboratories. His main interest was of course in the Department of Mining and Metallurgy, where he had the admirable guidance of Professor C. E. Locke '96. The half hour or so which the Secretary spent with him was given more to reminiscence and inquiry regarding former professors and our fellow class men and women than to trying to impress him with the greatness of the present plant, but it was evident that the magnitude of the Institute was fully appreciated. As chemist of the Port of New York Authority, Schiertz is kept very busy, but we hope that he will find it agreeable to make frequent future visits to Cambridge. The 40 years since we were companions in the analytical laboratories of the old Walker Building seem to have

dealt lightly with Schiertz, and it was the greatest pleasure to pick up again the threads of friendship as naturally as if we had been separated for only a few months.

Another old classmate and friend has recently been re-discovered. The Secretary has been much pleased to hear from Francis Green, and to exchange several letters with him. Frank is now living at 835 Glenside Avenue, Wyncote, Pa., where he awaits the return of industrial activity. I believe our last contact was either before or during the war when he was busily engaged in reorganizing an industry which was in particular need of his skill as a doctor of business. Possibly some member of the class can suggest industrial organizations that at the present time could profit by his skill in readjustment problems.

Nathan Cheney, after many years with the house of Stone and Webster, has severed this connection and is now engaged as special agent for the New York Life Insurance Company. Cheney and his wife still reside in Belmont. Their only daughter, after being for several years a member of the staff at Vassar, where she was graduated a few years ago, married a Technology man, which was quite as it should be.

Joe Phelan, as Professor of Inorganic Chemistry, now has the important post of directing all the instruction in first-year chemistry at the Institute. When it is borne in mind that the number of students taking this work averages around 600 yearly, it is seen that this is a position of responsibility. Probably no member of the staff is so widely known or so much sought for friendly advice by the freshmen who appreciate fully the kindness and frankness with which their problems are invariably considered.

The deep sympathy of all members of the class will go to Robert Weston and his wife in the death of their daughter, Elizabeth, in September. Miss Weston was a member of the class of 1935 at Mt. Holyoke.

The Secretary is glad to have recent addresses of the following members of the class, and announces them in the belief that other members may be interested. P. H. Coolidge, Carmel-by-the-Sea, Calif.; V. A. Mayer, R. F. D. 6, Batavia, N. Y.; L. W. Minot, East Milton, Mass.; Lee Porter, 62 Ash Street, Auburndale, Mass.; R. B. Price, Price Ranch, Los Alamos, Calif.; Dr. R. A. Richards, 134 Sutherland Road, Brookline, Mass.; Theodore Varney, 100 Main Street, Nantucket, Mass.; N. C. W. Chapman, 22 East Greenwood Avenue, Oaklyn, N. J.; H. E. Whiting, 10 Prescott Street, Cambridge, Mass.; H. F. Copeland, 88 Lexington Avenue, New York City; H. S. Duckworth, 1351 Cranston Street, Cranston, R. I.

Frank McKibben was elected President of the American Welding Society at its annual meeting in New York in June. *The American Business World* for June says of him: "Mr. McKibben has been associated with the American Welding Society for a considerable number of years, during which time he has gained the confidence and high regard of his many loyal friends

1894 Continued

and associates. He brings to his new post a background of experience and ability that should stand the Society in good order throughout his term of office.

"His ranking in the profession is attested to in the fact that he was awarded the S. W. Miller Memorial medal for accomplishment in welding during the past year. We may readily predict with assurance that his administration will be marked by constructive results and consistent advancement for the organization. He has long been identified with the American Welding Society and knows intimately its problems. Moreover, he approaches his duties with that systematic understanding and progressive point of view so necessary for the incumbent of this office.

"Mr. McKibben will be aided in his administration by other reliable and capable associates who will work in harmony to promote the best interests of the Society in its future activities. Thus from the qualifications possessed by the Society's new President and his associates we can expect its continued success and progress."

The Secretary, in his new post of Dean of Science, cordially invites all members of the Class to drop in to discuss educational affairs or to renew old acquaintance. He is also still continuing his work as head of the Department of Biology and Public Health, and retains his old office on the fourth floor of Building 10, where he will be equally glad to extend a welcoming hand. — SAMUEL C. PRESCOTT, Secretary, Room 10-405, M. I. T., Cambridge, Mass.

1895

The New York members of the Class of '95 held an enjoyable luncheon at the Bankers Club, 120 Broadway, on October 10. Those attending were Colonel Azel Ames, E. C. Alden, A. L. Canfield, Fred B. Cutter, John H. Gardiner, E. H. Huxley, John D. Moore, Franklin A. Park, Frank C. Schmitz, Richard B. Sheridan, Gerard Swope, Thomas H. Wiggin, and John C. Wolfe. Frank Park left for Europe on October 14 for a business trip, and carried an autographed letter from those attending this luncheon to Walter J. Rickey '95, Managing Director of the Singer Manufacturing Company, Limited, Clyde Bank, Scotland. Ben Donham was unable to attend the luncheon on account of illness. William E. Swift, who spent most of his time in New York, is now in Washington, D. C., with the Reconstruction Finance Corporation.

Laurie Hurd's daughter, Catherine, was married to Louis Bowman Graton on October 1. Mr. and Mrs. Graton will reside at 7 Craigie Circle, Cambridge, Mass., after December 1.

Some of our class wanderers are beginning to settle down, as evidenced by the fascinating letter just received from Gerard H. Matthes. We are delighted to quote the entire letter: "The Mississippi River has recently made a cut-off. What was once known as Hard Times Bend in that river will soon be a memory. Below

the cut-off is a long bend known as Hardscrabble Bend. Old Man River apparently has decided to preserve it for an indefinite period, and he usually has his way in matters of this kind. A little farther downstream is Dead Man's Bend, which I think is there to stay. No chance for a cut-off.

"I am telling you these things because I think they are prophetic. Hard times may go but life probably will continue to be pretty much of a hardscrabble affair to the end for many.

"I want to tell you and, through you, the Class of '95, that I have become permanently identified with the Mississippi River problem. This will account for those bends in that river being so much on my mind these days. Sometimes I awake from my slumbers to find my brain busily fixing some sore spot in the 1,000-mile stretch from Cairo to the Gulf. Others have done this before me with varying degrees of success, and I now sense the never-ending fascination which this great river, with its countless problems, holds for an engineer who delights in tinkering with water.

"As you have not heard from me for some time, let me review some of my later doings. In 1929 I quit consulting engineering in New York. Rotten business conditions impelled me to seek that old haven of refuge in hard times, the Government service. I landed a temporary job at Norfolk, Va., in charge of river investigations for the War Department. An earlier connection with that branch of the Government after the War, on the Tennessee River, had proven congenial. Reinstatement into the Civil Service, followed by rapid promotion, soon saw me installed in one of the newly created positions of Principal Engineer. This job was in the U. S. Engineer Office at Norfolk, and carried with it the title of Chief of the Hydraulic Division. The work proved most interesting.

"Although primarily concerned with the development of the James and Roanoke Rivers with respect to navigation, flood control, and water power, I found myself gradually drawn into the service of the Division Engineer's Office also located at Norfolk. There, working under General Harley B. Ferguson of the Corps of Engineers, I delved into the manifold problems of the rivers of the Atlantic Coast from the Susquehanna south to Florida. Special studies and reports followed, including such front-page notoriety as the Muscle Shoals dilemma, the St. Lawrence Waterway mixup with Canada, the proposed ship canal across the Florida peninsula, and last but not least the Mississippi River. For the past two years much of my time has been devoted to studying that stream.

"Early this year it became my good fortune to accompany the then newly created Mississippi River Engineering Board of Review on its first trip down the river from Cairo to the Gulf, riding most of the way on the crest of the February flood. On a subsequent trip of that Board, I had occasion to visit the many localities in the alluvial valley of the Mississippi in

need of fixing of some sort. Thus, an intimate contact was established with Old Man River.

"Soon afterwards General Ferguson was appointed President of the Mississippi River Commission, and my appointment as principal engineer in his office followed. And so, after spending a lifetime fooling with rivers, big and little, some habitually dry as a bone, some always inclined to climb out of their banks when least wanted, it has fallen to my lot to assist in devising ways and means of controlling the Mississippi. Lest you might worry about my getting my feet wet out here some day, let me add that I have selected my abode on high ground, whence I may view the most glorified flood that time may bring, with the utmost complacency and without creating a family row.

"Since your last month's class news was largely concerned with the younger generation, I will add for the sake of completing Class history that three youngsters now call me grandpa, two boys and a girl, all living in Arizona. Our only daughter, Florence, married Harry E. Stephens on June 14, 1926, at Prescott, Ariz. Mrs. Matthes and myself continue in good health and rather enjoy the prospects of living in this quaint little Vicksburg, a relic of the days when cotton was king and the planters of the Old South waxed rich. Richard Barthelmess' latest picture, 'The Cotton Cabin,' was filmed in these parts and portrays some of life's problems hereabouts. One thing I shall miss, and that is the opportunity I had while living in New York to attend Fred Cutter's class luncheons. The twin (brother, Francois Emile Matthes, Technology '95) is hale and hearty, and still deeply immersed in geology." — LUTHER K. YODER, Secretary, Chandler Machine Company, Ayer, Mass. JOHN H. GARDINER, Assistant Secretary, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

1896

It is with deep regret that the Secretary reports the death of Professor Harrison W. Hayward, which occurred on Tuesday, October 18, as the result of a severe heart attack the day preceding. The Secretary, with some other members of the Class, attended the services at the Fairview Cemetery Chapel in Hyde Park on Friday afternoon, October 21, and flowers were sent in the name of the Class. Hayward was born in 1873 in Dorchester, the son of Edward S. and Emma (Washburn) Hayward. After his graduation in 1896 he was an assistant in Industrial Chemistry at Technology for two years and then a draftsman with the Universal Loom Works for a year. He returned to Technology in 1900 to work as assistant in the Department of Mechanical Engineering. He became instructor two years later, Assistant Professor in 1907, Associate Professor in 1912, and full Professor in 1921. He was always popular among the students. He did a great deal to develop the work of testing materials. Incidentally, he was a member of numer-

1896 Continued

ous professional societies and also the Appalachian Mountain Club and the Charles River Country Club. He was the author of textbooks for the Lowell Institute and thoroughly revised Mills' "Materials of Construction." He was married November 4, 1902, to Miss Mabel E. Holmes, who survives him. There are no children.

Paul Litchfield called at the Secretary's office on October 8, but unfortunately the Secretary missed him. Litchfield's boy has entered Technology as a freshman this year.

Walter James reports a very interesting time the past summer when he spent three weeks around Underhill, Vt. He climbed Mount Mansfield, and also journeyed over into New York State. Incidentally he was in Vermont at the time of the eclipse on August 31, and got a splendid view of it. James reports that he sees Starbuck out in Waltham once or twice a year, and also runs across Hartwell occasionally. He had not seen Sanderson very recently, but felt that he might run across him almost any time.

H. C. Lythgoe has been on the air this fall giving an interesting and educational talk covering some of his experiences as Director of the Division of Food and Drugs of the Massachusetts Department of Public Health.

Karl Pauly, who is now rated as Engineer of the Industrial Engineering Department of the General Electric Company in Schenectady, was recently elected President of the "Test" Alumni Association of the General Electric Company at Schenectady. Pauly entered Test with this Company in May, 1899, and remained there until June, 1901.

Dr. Coolidge, who rates as Associate Director of the Research Laboratory of the General Electric Company at Schenectady, was co-author of two papers presented at the International Electrical Congress in Paris, July 4 to 12. One of these was with Dr. E. E. Charlton on "Modern X-Ray Tubes and High Voltage Generators" and the other was with C. N. Moore on "Experimental Study of Cathode Rays Outside the Generating Tube."

Henry Jackson reports that he and Mrs. Jackson have been busy getting settled in their new home at 29 Noyes Street, Concord, N. H., after having lived in Newton, Mass., for so many years. He actually believes that he is going to like the change, especially as he has work to keep him busy all the time. He has the agency in New Hampshire, Vermont, and Maine for the Stockton gauge, which he says is a mighty good device. He also has the territory of New Hampshire and Vermont for the Ludlow multi-valve, which is a new steam valve of unusual merit, a real everlasting valve that cannot wear out. In addition he is handling the France Company line of refractories, which is well known in New York and Pennsylvania, but new to New England. Finally he has the King Cole tube blower. Altogether it looks like a well-rounded line and if a man does not want to buy one thing, Jackson can sell him another.

We left the Fullers at Matadi, 90 miles up the Congo, at the head of ocean-steamer navigation, where they had left their ship after a voyage of over six weeks from New York, and their narrative continues: "We took a little narrow-gauge train around the first rapids, some 250 miles long with a fall of 500 feet.

"On the reservation card on the single first-class car, which had only 12 single seats, we appeared as Major and Mrs. Fuller, the military title being the local reading of Myron. Our way lay over big, rolling, grassy hills, dignified by the name of Crystal Mountains. A highway might easily be built, but that would interfere with the profits of the government-owned railroad. Similarly, although the larger towns have water supplies, the water is not purified. To do so would cut off the profits from drinks of the breweries, hotels, and cafés.

"At Kinshasa, or Lepoldville, we came down again to the river, which is navigable to river steamers for over 1,000 miles to the next rapids. Here we are on the trail of Stanley, a name still revered in the Congo. The present issue of postage stamps bears his portrait. On the bank of Stanley Pool, as the local enlargement of the Congo at the head of the rapids is called, he built the boats by which he explored the river and its tributaries, and later ascended on his famous trip to find Livingstone.

"Belgian Congo is a region of great agricultural resources, and there is a strong suspicion that the agitation over the so-called atrocities 25 years ago was largely fostered by England and other countries which hoped to obtain slices of the valuable territory. The Belgians have held on, however, and done much to develop transportation and trade. The cities, although small, would put most American towns to shame as regards streets, official buildings, hotels, and residences.

"The climate seems hot, although the temperature usually stands at 75 to 85 degrees. That is mainly because of the dampness and the lack of breeze, at least at this season when the surface of the river is like glass and not a leaf stirs on the trees for hours at a time. We have had two or three 'tornadoes' but out here these mean only sharp rain squalls.

"Mosquitoes are numerous and hungry. We used the last pieces of the Brockton *Daily Enterprise* we brought with us to put inside our stockings to discourage their mass attacks on our ankles.

"While waiting for the steamer on which we start the next 16-day lap of our journey up the Congo, we made a trip to Brazzaville in French Equatorial Africa, seeing the town, one of the Trader Horn 'localities,' in a pous-pous, sounding like push-push, the French name for jinricksha. Here, however, instead of the familiar two-wheel type of the Orient, there is a single wheel directly under the seat, and although there are two men to each vehicle, one of our weight sometimes careens startlingly." — CHARLES E. LOCKE, *Secretary*, Room 8-109, M. I. T.,

Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1898

We have a copy of the *Montana Oil and Mining Journal* of May 28, 1932, containing a discussion by Frederick C. Gilbert, metallurgical engineer, of methods of estimating whether gold prospects will prove profitable to work.

We also have before us the graduation program of Babson Institute of June 11, 1932. We note that Leroy D. Peavey made the presentation of portraits and Roger Babson presented the diplomas, and that 54 diplomas were presented as of that date and a total of 86 for the school year. It will be remembered that George Anthony is Professor of Industrial Relations at Babson Institute.

Robert M. Draper is back from a two-year contract in Russia, where he was in charge of the Kalata copper smelter. A new reverberatory has recently been completed there. Draper is well satisfied with his treatment in the land of the Soviets. He is now located at 54 Orchard Street, Belmont, Mass. — This address, just received from the Alumni Office, is of interest: Judge Everett N. Curtis, Township Justice Court, San Diego, Calif.

When we saw Elliott Barker's change of address to Lancaster, Mass., we wrote to ask him if he had also become a country gentleman. He replies that he has always tried to be a gentleman and has always liked the country, but does not consider himself a country gentleman. His family has grown up and he does not need his large house in Arlington so he has gone to this place in Lancaster which he and his brother have owned for 15 years. — ARTHUR A. BLANCHARD, *Secretary*, Room 4-160, M. I. T., Cambridge, Mass.

1900

The sympathy of the Class is extended to Mr. and Mrs. Fitch in the loss of their son, Ralph, who died in the York, Maine, Hospital as a result of injuries sustained in an automobile accident at York Centre. Ralph was a junior at Harvard College and, with two other students, was on the way to spend Columbus Day at Squirrel Island. Those of us who attended the recent class reunions remember his delightful personality and beautiful disposition. At the Engineering School, which he had attended for two years, he was a brilliant scholar and a member of the Speakers Club. Ingersoll Bowditch represented the Class at the funeral.

Dr. McCrudden reports in a fleeting street interview that he had a very pleasant summer in the mountains and is looking forward to one of our periodic class dinners soon.

Harry Osgood is now efficiency engineer with the Glendale Coal Company of Charlestown, Mass.

The opening of the subway extension under Kenmore Square, Boston, marks the completion of a five million dollar project which has been under the supervision of Wilbur Davis of the Transit

1900 Continued

Commission, employing about 1,100 men for about two years. Originally planned to be completed in the spring of 1933, it was hustled along and recently the opening day was set for October 24. The problem of week-end cutover to the new tracks was solved nine hours ahead of schedule and is quite a feather in the cap of our old regimental bugler. Bring 'em on, says Wilbur. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

In my notes last month I mentioned Leroy Backus of Seattle as one likely to be present at the next reunion. Imagine my pleasure when a few days ago I received a call from him. It was at the end of a hurried trip East, I presume to look over the hibiscus situation, and was on the eve of his departure for Seattle. We had but a scant half hour together before he had to dash for the train, but in that brief space we brought ourselves up to date on a number of important matters. Among Leroy's many business activities have been a variety of reclamation and irrigation projects. One of these was the development of a large fruit-growing district, an enterprise consummated over a decade ago. Recently Leroy has received a delegation from the satisfied clients who took up the farms to ask him to come back, organize them, and run their show for them.

Speaking of fruit, I have just had an amusing and interesting experience which I hand on for the benefit of those of you who are gastronomically inclined. Some years ago I embarked on a correspondence with Zapf, who graduated in the late nineties. He is running a fruit ranch in southern California and recently, in response to some vain words of mine anent California fruits, he sent me a box of products indigenous to the soil but to me wholly unknown. Among them was a thing called a sapota, which looks either like a green apple of dubious paternity or a quince that some misguided soul has endeavored to improve with Old Dutch Cleanser. Zapf suggested that this should not be eaten until "mellow to the hand" a direction of possibly ominous import. I thought the question over for some time, wavering between a one-piece bathing suit and the bath-tub, or the center of Copley Square triangle at an hour when the traffic squad had retired for the night. Ultimately, however, I faced the matter bravely, inserted a fork in the swelling contour of the luscious fruit and pried out a small piece of the grayish pulp which was disclosed. Great calamities should be faced bravely and dealt with briefly. IT WAS NOT SO GOOD. And then I thought me, so I took a fragment of lettuce, placed upon it some further morsels of this product of the Golden West and added a little salad dressing, French, in which due attention had been paid to the savory qualities of garlic; then I tried it again. And I will arise to remark at this point that used in this way it forms one of the most delicious salads that I have ever eaten. I don't get anything for advertising

this; it is just one more expression of my natural benevolence toward mankind at large and my classmates in particular, but if any of you meet a sapota, deal with it as I have indicated and you will have a treat. Zapf also sent me a small fruit called the feijoa, which suggests in its multiplicity of flavors and odors some of Luther Burbank's more obscene tamperings with the natural law of selection. All of this is but the expression of a defense mechanism to prove to Fred Clapp that I, too, have had experiences.

Since we are dealing with California, I was delighted not long ago to receive word from Henry Marcus from whom I have only heard indirectly for many years. Henry is a boy philatelist, like your secretary, and, like the latter, considers it only as a hobby. His real job is that of Secretary and Treasurer of the Fourness Development Corporation, which is concerned with refrigeration for transportation and manufactures equipment which has a very extended use throughout the West. More fruit. One drawback to it that I see is that you can't mix a cocktail with it, but as the Volstead Act is unofficially abrogated only in the effete East, I suppose that doesn't make any difference. Grape growing, so I learn through well-known political channels, is applied only to the manufacture of raisins and innocent beverages. As the poet so gracefully puts it, how quickly does innocence fade when sacramental uses insinuate in the picture.

Turning to the seat of government by a logical transition that even a child could grasp, I have just had a long and friendly letter from John Boyle, Jr., who has raised three little Boyles, which from their pictures do great credit to the old man. Incidentally, John has three nice kiddies, two girls and a boy, who from their smiling faces are seemingly untroubled by the depression. As they live in Washington, however, it is highly probable that they know nothing about it. John recalls fondly his earlier acquaintance with the Strawberry King, a neighbor of his across the Potomac. They have given up singing that tender old ditty of our childhood "All Quiet Along the Potomac Tonight" since Al moved down to Alexandria. John analyzes the financial situation as influenced by Congress in a way vastly interesting to the reader but not entirely suitable for broadcasting since John is a resident of the village that houses the seat of the government, the latter seemingly its most significant anatomical part. I can perhaps sum up John's attitude by the story of that other great Washingtonian, Cal Coolidge, which though an old timer may not as yet have reached the home of the sapota. Cal had been to church on the Sabbath day and on his return to the Chateau Coolidge was questioned by some member of the family as to the subject matter of the sermon. "What did the minister talk about today?" was the question. To which Cal replied, with a characteristically Johnsonese circumlocution, "Sin." "And what did he say about it?" was the next question.

"Against it," was the answer that terminated a discussion that would otherwise have been dear to the heart of the present-day mathematician. So is John.

Charlie Auer, of whom John speaks in his letter with tender recollection, has also resumed his contact with the Secretary and in answer to the query as to interesting news shoots the following hot one: "Should our noble citizens repeal the 18th Amendment, then this far off place will lose its place in the sun — however, until that time we will continue to live openly, while you poor souls must drink poison." Charlie reports his present occupations as: 1. Interested in mining, 2. Metal buyer, 3. Producer of walnut burls. Outside of an outspoken admiration for the catholicity of Charlie's interests, this statement requires further analysis. As Charlie was a graduate of Course III, his first statement on the one hand registers his loyalty and fixity of purpose, and on the other is a delicate compliment to the department. I hope this catches their collective eye and brings a throb of gladness. The second attribution leaves me a little at pause. It is a fairly comprehensive occupation that and I hope in some future communication Charlie will relieve my anxiety. I have an eighth interest in a fourth-hand Ford that came to me by inheritance which, as the paint has all gone and it never was oiled, might interest him. Also I would like to buy a large bronze church bell, such as I understand to be a favorite form of missile; I want it for secret purposes which I will not divulge. A couple of Spanish cannon of the Isabella period would also interest me. Now the walnut burl, as I know it, is a malignant growth infesting one of our varieties of noble shade tree, which with its complementary haircloth forms the basis of the antique furniture now so popular with Middle-West collectors. In these days of sophistication, I hope that Charlie is not conniving with Grand Rapids to sully the stream of "genuines" which have been emerging from New England attics for the past ten years. Maybe they make kegs of them in El Paso; I don't know, but Charlie probably does.

All of which patently reminds me — and you — of the fact that the Class of 1901 holds its Thirty-Third Reunion this June. Join the sign-ups. — ALLAN WINTER ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1902

The center of gravity of the Class has shifted somewhat to the eastward. Our Class President, Les Millar, has shaken the dust of Chicago from his boots and has established his lares and penates at 18 Barclay Road, Scarsdale, N. Y. We expect to publish the business meaning of this hegira in the next issue of *The Review*.

Among last June's graduates were Miss Priscilla Place from Wellesley, Edward Philbrick from Technology, and Miss Florence Gardner from the Leslie Normal School, Cambridge. Joe Philbrick, who came on for his son's graduation, went

1902 Continued

with Grant Taylor to the Pops while in Boston, and there met Mr. and Mrs. Steve Gardner, and a good time was had by all.

The Class continues to have a delegation at Technology, Wendell Fitch and Alice Hunter being among the entering Class this fall. Young Fitch is running on the Freshman Cross Country Team.

Bourneuf is with the Inman Square Iron Works, 171 Second Street, Cambridge. — Manning is salesman for the Rex Roofing Company of 683 Broad Street, Bristol, Conn. His field of activity is in central Connecticut, Hartford and vicinity. His residence address is Plainville, Conn. — Ehle's residence address is 731 Hazelhurst Avenue, Merion, Pa. — Bernard G. Elliot's address is Woods Hole, Mass. — FREDERICK H. HUNTER, *Secretary*, Box 11, West Roxbury, Mass. BURTON G. PHILBRICK, *Assistant Secretary*, 246 Stuart Street, Boston, Mass.

1905

From a Portland, Maine, paper: "Thomas W. Estabrook has been transferred from the Portland offices of the Brown Company to another executive position at the company's large paper manufacturing plants at Berlin, N. H.

"Mr. Estabrook came to Portland in 1925 as general purchasing agent for all of the Brown Company's interests in Maine, New Hampshire, Florida, and Quebec. During his stay here he has been identified with the Portland Rotary Club, of which he has served as Vice-President during the past year, as a member of the board of the Cumberland County Council of the Boy Scouts, and has been also interested in various other clubs and organizations in the city.

"Mrs. Estabrook is closely connected with the activities of the Portland Young Women's Christian Association as a member of the board of directors, and is an active member of St. Martha's Guild of St. Luke's Cathedral.

"Mr. and Mrs. Estabrook will maintain their residence at 130 William Street until next spring."

From the Boston *Transcript* of September 21: "Damage estimated at \$8,000 was caused early today in the home of Sidney T. Strickland, a Boston architect, at 170 Dudley Street, Brookline. Mrs. Strickland and her 20-year-old daughter, Jane, had difficulty in reaching the street from their sleeping rooms, as the fire started on the first floor and worked up through partitions, filling the upper part of the building with smoke. Two alarms were given after a taxicab driver had discovered the blaze while passing." We extended our sympathy to Sid but got no additional information.

The Gillette Safety Razor Company recently advertised: "In a decision just handed down by the United States District Court, District of Connecticut, Gillette patents in that suit were declared valid. The defendants were held liable for costs and damages" which must have pleased Hub Kenway. — Ralph Forsyth, with whom there has been no contact for years, wrote a postal which said: "Will send you before long, for the

class records, an account of myself since 1905." Hasn't come yet. — About a year ago the Carnation (Milk) Company moved some of the executives, including Wallace MacBriar, from Oconomowoc, Wis., to Milwaukee. As Mac says: "Those of us who are in Milwaukee are merely putting on a little more 'dog' than was possible out in the country." — Walter Eichler has sent in a Harwichport address. — Driving through Searsport this summer, your Secretary thought of Bob Nichols but didn't have time to hunt out Box 223. — Bob Luce's address for some time will be U. S. Coast and Geodetic Survey, Manila, P. I.

From Andy Fisher: "I am still plugging at textile advertising. The machinery people are picking up a little business. The second-hand people are doing very well. Dye-stuff dealers have been hard put to meet deliveries for the past three months but it was a wild rush to get woolen and worsted goods out for the fall trade.

"I met Grove Marcy, Hub Kenway, Files, and Tower within about five minutes of each other on the street recently and all were looking well. Burkhardt is around town some."

From George Jones: "I was thinking of you a week ago today as I stopped at Springfield on the way home from Boston, where I went on a very short and unexpected business trip. I was in Boston only one afternoon and through the kindness of Hub Kenway, spent the night at his home in Beverly, leaving for Chicago promptly the next morning. Hub took me around to Grove's office just before dinner and I had a very nice visit with Grove, whom I had not seen in about seven years.

"I have seen Frank Payne a couple of times this year and frequently talk to him over the telephone but otherwise never see anyone you know.

"Margaret is a sophomore at the University of Colorado, and Bayard, who graduated from Northwestern in June, had several temporary jobs during the summer and is now helping me at the office and attending a downtown law school, late in the afternoon, toward the close of business hours.

"I was very glad to have a glimpse of M. I. T. the night Hub drove me from Boston through Cambridge and up the north shore to Beverly. The man I went to Boston to interview regarding a patent matter, whom I had never met, turned out to be a graduate of M. I. T. '13.

"Hub told me that his son was in the Bermuda race and met you during the proceedings. I envy you those sea voyages. The most sailing I had this year was Labor Day in a canoe on a lake in the Northern Peninsula of Michigan. The trip to this fishing club to which I was invited involved a 900-mile automobile trip, the purchase of a fishing license, and the landing of one fish, which was not quite long enough to meet the legal requirements. Perhaps I would do better as a sailor if I had more opportunity."

From Bill Motter: "Bob Lord was down a few weeks ago. I had lunch with him. It did my soul good to see him. We

had a couple of weeks for a trip to the Adirondacks, stopping for 10 days at Blue Mountain Lake. It was a nice change for us all, but Joan (the little girl) was mightily pleased to get home."

Jim Rogers writes from New Dorp, Staten Island: "I was stepping along very well at Cramp's and they went out of business, that was goodbye to Course XIII for me. The last ten years, I have been designing on Power Houses and Coal Handling Systems with the American Gas and Electric Co. I was one of the many that stayed in Wall Street too long and was caught in the crash."

Once more we must record the passing of a classmate. "William F. Smart, 50, lifelong resident of this city, and well-known business man, died early Monday forenoon (September 12) at his home, 332 Main Street, Lewiston, following an illness of over a year. About six weeks ago, Mr. Smart's condition became critical, grew steadily worse.

"He was born in Lewiston, February 12, 1882, the son of William T. and Sarah Fuller Smart. At one time his father was postmaster of Lewiston. — On August 29, 1912, he married Miss Margaret Strachan, who died last June. Since 1920 Mr. Smart had been connected with the Bates Street Shirt Company and up to last April was sales manager for the factory. He was a member of the Masonic orders.

"Surviving are four children, Miss Betty Smart, a student at Farmington Normal school; Donald, Barbara, and William F. Smart, Jr., all of Lewiston." — ROSWELL DAVIS, *Secretary*, Wesleyan University, Middletown, Conn. SIDNEY T. STRICKLAND, *Assistant Secretary*, 20 Newbury Street, Boston, Mass.

1906

The Secretary is fortunate in having a few items for this issue of The Review and he appreciates the interest of classmates who have voluntarily submitted items of interest. He bespeaks the coöperation of all members of the Class in forwarding material which can be used for this column.

Under date of September 7, Professor Locke, the Alumni Secretary, advised that he had heard of an accident happening to M. W. Hayward, III. As a result, we communicated with Hayward's brother who is Associate Professor of Metallurgy at M. I. T. We are indebted to Professor Hayward for the following in regard to M. W.: "The accident to my brother, Marden, to which you referred in your letter of October 14, occurred in the early part of the summer. I am glad to say that my last letter indicated that he would soon be about again. Ever since graduation he has been climbing in and out and through mines in various parts of the country and in various states of repair but this year for the first time he had a serious accident when a ladder broke, causing him to fall about 30 feet. As a result he had a broken ankle, several toes and several ribs were broken, and he was otherwise badly shaken up. As stated above, he has nearly mended now and hopes to be about soon."

1906 Continued

Henry Ginsburg has forwarded a copy of the weekly paper of the Cambridge (Mass.) Industrial Association. This included an article concerning T. L. Hinckley which is of interest. "Here is news that is news! Professor Thomas L. Hinckley, former Head of the Department of Municipal Research at M. I. T., has begun work on a survey of our local city government. He will consider the advisability of consolidating certain departments, will study the proportion of employees to the amount of work required and his investigations will cover all departments, including fire, police, public welfare, and the schools.

"Professor Hinckley has a national reputation in his particular field. Many cities have profited by adopting the recommendations he has made. Undoubtedly he will find ways of saving money in the administration of our city government. He will, naturally, have no power to put them into effect. That must remain with the taxpayers of Cambridge. We shall see what we shall see."

No notes would be complete without a reference to our Hawaiian classmates. We commend Bill Furer's parental pride which prompted him to send the weekly bulletin of the Engineering Association of Hawaii, prepared by Bill as Secretary, on the end of which the following note was appended: "The Secretary may be pardoned if he takes this opportunity of sharing with his many friends in the Engineering Association a piece of news which came to him by cable Monday night, July 18, announcing that his son, Albert B. Furer, had been admitted to the U. S. Naval Academy." To this Bill added a postscript. "This is the older of our two boys. He will be in the class of '36 at the Academy—just 30 years behind our procession."

As chronicled in previous notes, George Hobson's elder son enters West Point this fall. The Class is proud to have the sons of two of its members choosing careers in the armed services of the country.

Engineering, which is a journal of the Engineering Societies of Boston, is responsible for the following note about D. D. Eames, II: "D. D. Eames of Lockwood Greene Engineers, Inc., has opened a consulting engineering office at 410 Commonwealth Avenue. Mr. Eames has been head of the steam engineering department of Lockwood Greene in Boston since 1919. He has been responsible for all power plant design, heating, ventilating, fire protection, special reports and various other problems." Also, this same publication included a paper by Johnson O'Connor entitled "Taking a Man's Measure." This article was reprinted from the *Atlantic Monthly* and concerns the application of aptitude tests in the measurement of human capacities. Mrs. O'Connor was formerly Miss Eleanor Manning of our Class.

It is assumed that the golfers of the Class have been working diligently during the past summer to improve their game so that the best gross score at the 1936 Reunion will be under 104. We have

no authentic news on this subject other than results of the University Club of Boston tournament which was held in the middle of September at the Winchester Country Club. The score sheet showed that R. R. Patch won second net with a score of 83. He, also, took first net in the weekly tournament for Class "B." Congratulations, Ralph, but how about the gross scores? — JAMES W. KIDDER, *Secretary*, Room 505, 261 Franklin Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

Last month we recorded the death of Willis Ranney. Through the courtesy of Mr. Graham Dowdell, an attorney of San Antonio, Texas, who was a close personal friend of Ranney, we give the following facts.

He died a sudden and violent death as the result of a fall from one of the upper floors of the Alamo National Building in San Antonio. There are no facts existing to warrant a conclusion that his death was other than accidental. He was not in financial difficulties or in bad health. From 1907 to 1909 he was engaged in engineering work with the Chicago Great Western Railroad. After that he went to San Antonio and associated himself with Terrell Bartlett '06. As partners, they were employed in the construction of the Medina Dam, which was an irrigation project about 30 miles northwest of San Antonio, for the purpose of impounding approximately 300,000 acre feet of water, more or less, at a cost of about \$6,000,000 and distributing the water to about 60,000 acres of land. Thereafter he was employed in building a dam for this same group at Lerda, Spain, and a hydraulic power dam in the vicinity of Barcelona. Immediately succeeding, or during, one of the intervals of time between his work in Spain, he was employed in constructing another irrigation dam in New Mexico, near Springerville. He then returned to San Antonio and was interested in the construction and sale of a number of small residences there. About 1925 he was employed by the Mexican Light and Power Company of Mexico City in the construction of a number of water power projects, just concluding about January or February of 1932.

He was regarded as a very able and successful engineer. He was married in 1912, and his wife, with two children, Delphine, age 18, and Willis, Jr., age 6, survive him, their address being 116 Rosemary Street, San Antonio.

News regarding living members of the Class seems to be lacking at the time of preparing these notes. Many men failed to send in the "Statistics Sheet" sent out last May with announcement regarding the Reunion of last June. Possibly some of you who read this may have overlooked this coöperative act, and will be glad now to send in the information requested, thus providing notes for The Review and facts for your Secretary's records. — BRYANT NICHOLS, *Secretary*, 19 Rowe Street, Auburndale, Mass. HAROLD S.

WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Co., Whitman, Mass.

1908

News has recently reached the Secretary of the marriage of Clifford L. Wade to Miss Adaline Anderson, in Kansas City, Mo., on May 21.

Harry Sweeney has arrived home from Rhodesia. He reports a most delightful and interesting trip via the East Coast of Africa and the Mediterranean, stopping at Genoa, Marseilles, Malaga, Palma, Centa, and then Lisbon, Southampton, Rotterdam, and finally Hamburg, whence he sailed for the United States. He is now residing at 18 South Munn Avenue, East Orange, N. J.

We recently heard from Ben Hammond that he has been engaged in the insurance business for several years, handling a special line for banks and trust companies in the United States. He has two sons and three daughters, and has been living in Montreal for the past few years. — George Belcher is now living on Carlton Road, Waban, Mass.

We regret to report the death of Douglas Cairns, which occurred on October 6. Cairns was Treasurer of the Signal Engineering Company of New York, and his death followed several months of illness.

Your Secretary has been in communication with George Glover in Lima, Ohio, who reports that plans are under way for a gathering of the boys in his vicinity to discuss plans for our coming Twenty-Fifth Reunion. — HAROLD L. CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

1909

Here is a letter you will all be glad to read from Ramon F. Muñoz, who lives in Monterrey, Mexico:

"All my activities now are confined, as they have been during the last ten years, to the development of oil and gas in the northern part of the States of Coahuila, Nuevo Leon, and Tamaulipas of Mexico, in a zone adjacent to the Rio Grande. We are now pushing development with good prospects. My partner and I were, in a large measure, responsible for bringing natural gas in 1929 from Jennings field, Texas, to the City of Monterrey, N. L., in a pipe line 12¾" and 156 miles in length, this being the first international gas pipe line.

"I visited Tech during last year's commencement and regret that I saw few of my classmates, but you may assure them a warm welcome when they come to Monterrey or Mexico if they let me know."

Just a few days ago I was surprised to have a telephone call from Chill Sharp, who lives in North Hollywood, Calif. It seems that Chill was spending a few days in Winchester, Mass., only three doors from my house, before starting back to California, having driven on with his wife and daughter for the summer at Nantucket, Mass.

Bill Kelly called up a couple of weeks ago to tell me that he was in town. Bill says that he is spending \$100 to get 10¢

1909 Continued

worth of business. He promises to write me more in detail when he returns to Philadelphia.

The Boston *Transcript* of October 15 states: "Royce W. Gilbert, of Chase and Gilbert, Inc., Boston, engineers and builders, will give an evening course of eight lectures on building construction, beginning next week, under the auspices of the State Department of Education's University Extension Division.

"Job organization, personnel, equipment, purchasing, new materials, bogies, progress charts, and inspection are subjects to be considered. The lectures will provide a practical discussion of fundamentals and current practices in building construction for foremen, timekeepers, and all others desirous of progressing in the construction industry to executive responsibility. For graduates of technical schools, the course offers an opportunity to become acquainted with the latest practices in structural engineering.

"Important buildings built by Chase and Gilbert during the past few years have been the Ritz-Carlton Hotel, the Motor Mart and Bowdoin Square garages, dormitories and laboratories at Technology, and apartment houses."

Muriel Haynes, who was manuscript reader for Little, Brown and Company, had an interesting article in the Boston Sunday *Herald* of October 16, in which she gives advice to hopeful authors. She, herself, is now preparing a series of textbooks for general school use under the direction of the Horace Mann School at Columbia University.

George Haynes's other daughter, Marguerite, graduates in June from the Lowthrop School of Landscape Architecture and Horticulture at Groton, Mass. George says that he and Jim Finnie had a real Italian party the other night, with everything that goes with it.

The following letter was received recently from Mayo D. Hersey: "It can be stated that my address was changed last year from the Bureau of Standards, Washington, D. C., to the Research and Development Department, Vacuum Oil Company, Inc., Paulsboro, N. J., where I am serving as mechanical engineer and head of the Engineering Physics Division, previously designated as the General Lubrication Division.

"Other M. I. T. men here with offices nearby are Dr. W. G. Horsch, XIV, '13, Head of the Insulating Oils Division; W. B. Ross, X, '17, Head of the Chemical Engineering Division; and T. M. Gunn, XIII, '05, Head of the Service and Maintenance Division, which includes the design of research apparatus and machinery as well as the administrative work indicated.

"As I don't recall when you were last supplied with particulars, the story can be summed up by saying that since 1909 my time has been distributed as follows: three years (in the aggregate) teaching at M. I. T.; four years with the U. S. Bureau of Mines; and 15 years (at different times) with the U. S. Bureau of Standards."

B. E. Hutchinson, Vice-President of the Chrysler Corporation, and Chairman of

the Board of the Plymouth Car Company, is to give a lecture on the "Automobile Industry" on December 13 at Princeton University, this being the first of the Cyrus Fogg Brackett Lecture series of 1932-1933. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. PAUL M. WISWALL, *Assistant Secretary*, General Foods Corporation, 250 Park Avenue, New York, N. Y. MAURICE R. SCHARFF, *Assistant Secretary*, 1 Wall Street, New York, N. Y.

1910

News has been received of the death of Walter Brownell. The U. G. I. *Circle* of Philadelphia published the following obituary: "Walter Keith Brownell, United Engineers and Constructors, Inc., prominent in engineering circles of Philadelphia, died on August 9 of pneumonia at his home in St. David's. He was 44.

"Mr. Brownell was born in Brookline, Mass., and was graduated from the M. I. T. in 1910. After serving as instructor in that institution, he held various responsible positions in Boston and New York, and for six years was with Stone and Webster Engineering Corporation.

"In 1928, when Dwight P. Robinson and Company was merged with other companies to form United Engineers and Constructors, Inc., Mr. Brownell continued as chief of the structural engineering division, with headquarters in Philadelphia. In 1929 he was assigned as structural engineer on the Philadelphia improvements of the Pennsylvania Railroad. He carried important responsibilities in connection with the passenger terminal facilities at the new West Philadelphia and Thirtieth Street Suburban Stations.

"He was active in engineering organizations, a member of the American Society of Civil Engineers, American Society for Testing Materials, American Railway Engineering Association, and of the Pennsylvania Golf Club. He leaves a widow, Lillian Bowles Brownell, and three children."

Bradley Jones writes: "For the past three years, I have had charge of the Department of Aeronautical Engineering at the University of Cincinnati, one of the few colleges in the country giving a complete course leading to a degree in this subject. Have published a book on 'Air Navigation.' The head of the Civil Engineering Department here is a Tech man, H. B. Luther (Class of '08). I see Nat Ransohoff occasionally. I am still unmarried."

Bill Keefe responds briefly and to the point: "William J. Keefe, Chief Engineer, Department Public Utilities, State House, Boston, Mass. Married, live at Hingham. Wife, six children (4 boys, 2 girls)."

The Wm. O. Lichtner Associates, Statler Building, Boston, announces its formation, one of the associates being Gorton James. The announcement says: "Mr. Gorton James has been engaged for 22 years in management, executive and organization work, principally in connection with sales management. He was formerly Chief of the Domestic Commerce

Division of the U. S. Department of Commerce, having charge during the original development of government research in the field of distribution or marketing."

Edward Kollen is heard from for the first time: "I was pleased and surprised to receive your letter of September 30, which reminded me that I once went to Tech and, of course, I am glad and proud of that.

"I am ever mindful of 'On Rogers Steps' — 'to those who win, to those who lose, the end is just the same.' I have received much consolation from that beautiful thought in that fate decreed that I should not complete my course at Tech. My limited contact with Tech inculcated in me a great Tech spirit which has ever helped me to struggle through many difficult places. I owe much to the philosophy of free-hand Charlie Sawyer, whose 'talk fast, walk fast, act fast, fast and sure' admonitions have been very helpful to me as well.

"While I have received numerous communications from you in the past, I have felt that my one year at Tech really did not entitle me to active membership in the Class, but the spirit of your letter has prompted me at this time to write you in response to your friendly request for some news.

"I am practicing law and carrying on the family baking business at 94 Brookline Street, Cambridge, and I would be particularly happy if you and the other fellows would look me up and let me know something about what has happened since last we met." — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

1911

Here at Douglas Hill, as the last week in October starts, the days are gorgeous, and so kind has Mother Nature been to us that we are just half through picking our apple crop, with the remaining fruit gaining in size and color daily. We closed the Inn a month ago and on the last Sunday in September had a fine Technology gathering of the M. I. T. Club of Western Maine. At the business session which followed the chicken dinner, your Secretary was elected President of the group for the 1932-1933 season.

In late September, Friend Wife and I went to Bar Harbor to attend the annual fall pilgrimage of the Maine Hotel Association, and on the way back stopped at Bangor to see Stu Copeland, II. Unfortunately for us, he and his wife were out of the city, but it was nice to learn that earlier in the month they had been the proud parents of a baby daughter — Stu afterwards advising me that mother and child were fine.

Commander Ralph Hanson, XIII-A, for a number of years assistant naval *attaché* at the American Embassy in London, England, was this summer transferred to the navy yard at Puget Sound, Washington. — Sam Hayes, V, for years plant manager of Hartsville Print and Dye Works, Hartsville, S. C., is now with Ceba Company, Inc., Greenville, S. C.

1911 Continued

Among late season dinner guests at Douglas Inn we were delighted to welcome Carl Richmond, I, and his wife; George Estes, II, and his wife; and Bursar Horace Ford of Technology and his wife, with Professor and Mrs. L. F. Hamilton '14.

Certainly all '11 men, particularly Course II men, will mourn the death of Professor Harrison W. Hayward '96 on October 18. He was a leading authority on testing materials and had a most pleasing personality.

Harold Davis, I, is still making the headlines with his work on job stabilization, although he seems reticent to supply a story to us for use in this section despite several requests. On October 11, both the Boston *Herald* and the Boston *Post* carried group pictures of the New England Share-the-Work-Committee, of which Harold is a member under the chairmanship of another Nashua, N. H., man, Winthrop L. Carter.

Dave McGrath, 1912's hustling Secretary, sent me a tear sheet lately from McGraw-Hill's *Electronics* for October on which was an intimate photo titled "NBC's Chimeless Chimes." It showed Dick Ranger, VIII, inventor of the pipeless organ, the bell-less carillon, and RCA's facsimile transmission, explaining his latest invention to O. B. Hanson, manager of technical operation and engineering of NBC. Perhaps you don't know it, but this new automatic device now supplants the familiar three-note NBC chimes. Think of Dick when next you listen to the conclusion of your next WEAF or WJZ network program.

Once again the old familiar sign-off, compliance with which assures more and newer class notes: write to Dennie! — ORVILLE B. DENISON, *Secretary*, Douglas Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

It must be the reaction after the fervor of interest in our Reunion. Whatever the cause, we seem to be almost destitute of news or information about our classmates. About the only thing we have to relate is a brief visit from Charlie Cabene, II, who was in New York recently. He reported a successful operation on his wife's coat after the reunion. Some of you who were with us at the Mayflower Hotel will recall that Mrs. Cabene and your Assistant Secretary's wife both sat themselves down in some nice gooey tar which had evidently been left over when the otherwise thrifty hotel people were patching the roof. Their strident wail when they discovered the damage brought forth a half dozen or more expert chemical opinions from our Course X brethren. The unhappy husbands tried them all, but in the end the gals had to go home in barrels, figuratively speaking, and turn the coats over to official cleansers.

Let's have some letters, fellows. Your secretarial staff is always capable of padding out a column of fiction, philosophy, or scientific twaddle, but they ought not to have to. — FREDERICK J. SHEPARD, JR.,

Secretary, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York, N. Y.

1914

It is with great regret that we have learned of the death of Thomas J. Shack on December 22 of last year. Shack entered Course I after graduating from Williams College, and after his graduation from Technology spent several years in the Government service both in the Coast and Geodetic Survey and in the Navy. At the time of his death he was assistant head of the Engineering Department of S. W. Straus and Company.

Your Secretary and Mrs. Richmond enjoyed a very pleasant visit recently from Walter Hauser and Mrs. Hauser. Late last spring Hauser decided that he could stop losses faster by giving up his business activities. He has been spending the summer quite largely touring New England but has now returned to Waterbury, Conn., where he hopes before long to again be associated with the brass industry.

While in Vermont recently Dean Fales discovered a heated campaign under way for the election of state senator from the district including Thetford. Great was his joy when he learned that the leading candidate was none other than our own Porter Adams. Dean also learned that Pat was running with the best wishes of that famous native Vermonter, former President Calvin Coolidge. Knowing Pat as we do, we feel certain that his election is assured and that the state of Vermont will have a most excellent member in its legislature next term.

Your Secretary recently tried to locate Jimmy Judge, of Holyoke, bright and early in the morning at his house only to find that he was down at his factory with the rise of the sun and reported that business was decidedly looking up. After what the paper industry has been through, this is a most encouraging note. — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, N. Y.

1915

The life of a (or, at least this) Class Secretary is a hard one. If it were not for Lucius's forgiving and indulgent nature, combined with his droll sense of humor, I should consider myself severely reprimanded by his following letter. Lucius's writing looks as though he had done it with a brush, so to have deciphered it with only those few errors qualified me for plus or minus something in precision of measure. (And memories of our sophomore year — there was a course.) Lucius writes from Durham, N. C.: "I have at last gotten around to replying to yours of July 9, but I have a real excuse, this time, haven't I? When I sent that letter which filled your column recently, I had no idea that it would be possible for me to supply you with more copy for quite some time. However, time brings changes — good

changes as well as others — and now I have (at last!) joined the ranks of the benedicts. One by one the old standbys slip away. How about yourself, A. W.?

"Well, as you have already heard, I was married on June 25, at Warren, Mass., to Miss Mary L. Cummings. My dive into the matrimonial sea was not taken in any hurried manner and I am quite sure that it was one of the wisest steps which I ever have taken. Not only that, but I am as certain as anyone can be of anything on this whirling conglomeration of electrons (I take it Lucius means this earth) that I shall be of the same mind 25 years from now. — I know my handwriting is terrible, but even so, I must ask you please to correct a few extreme errors that crept into my long letter as published in the 1915 column: 1. I have charge of the organic division of the Chemistry Department and not the whole department, 2. Durham is the fourth largest city in the state (N. C.), not in the South, 3. I object to your saying that we have a horse show stadium! We have a very fine horseshoe-shaped stadium and are a bit proud of it. They may show horses on the State Fair Grounds at Raleigh, but not here.

"You see I try to put a bit of a simile into my letters, but I don't want all my old classmates to think that my experiences in the South have deprived me of my reason! My wife and I will be glad to welcome any of the Class who may come this way and to do anything possible to assist in making their stay in Durham pleasant."

Really, when I first read this letter, I marvelled that such a large crowd would gather, even in the South, to watch a horseshoe pitching match in a stadium built especially for it. My error, the anatomical description applied to its shape and not its purpose.

From London, Doug Baker, loyal and faithful as ever, writes this splendid letter. The first paragraph touches me gratifyingly and is a reward for the time and effort I put into our notes. It is interesting to read of Doug's business experiences and delightful to read of his family problems and his observations on foreign conditions. Who can challenge those five children as a record class family? I know you will all share with me a genuine enjoyment in this letter and join with me in sending Doug our appreciation.

"Watching our Class notes while they gradually creep away from the newly-graduated end in *The Technology Review* and serve as a reminder of the passage of time, I am struck by the constancy with which news of our Class appears and how gently, on the whole, time has dealt with us. As for the constancy, there can be no illusions that it is entirely a natural growth. On the contrary, it must take careful and arduous cultivation. I hope that you, as the horticulturist, get some pleasure from the work, as well as all the labor and that, if only for my own appreciative enjoyment, you always have a good harvest.

1915 Continued

"Since April, 1920, I have been away from Western Europe only for eight weeks. That was in 1927, when I made a visit to the States. It would be a great pleasure to get back home again and renew old acquaintance as well as family ties. However, from time to time my own people have looked me up over here.

"In case some '15 man has a chance to drop in and see me, my address is Connaught House, 63 Aldwych, London W. C. 2; phone Holborn 8765; cable address, Instancelco, via Commercial. From 1920 to 1925 I was in Barcelona, then until the end of 1929 I was in Madrid on the manufacturing side of a telephone system development of the International Telephone and Telegraph Company, which, during the period 1925-1929, covered Spain with the best telephone system in the world. Since then, I have been in London with the International Standard Electric Company and the I. T. & T. Laboratories, Inc. In all these years the job has been, and still is, an interesting one.

"Probably I have the largest family of anyone in the class, three boys and two girls. The two older boys are already away from home most of the year in accordance with the almost inescapable English custom of sending boys to a preparatory school when they are around eight years old. By next summer we shall have to settle our first major educational problem. After prep school, shall it be secondary school, public school, or some other alternative? The arguments for and against the public school are as numerous as the schools themselves. Our decision will probably be that a part of the family should migrate to Switzerland for a few years until the children go to the States. Almost every American living abroad from necessity wants his children to spend at least a part of their most impressionable years of life in the States so that their mixture of languages will be only a background. I have mentioned education rather extensively because it is the education of children in a foreign country, while preserving their national identity, that causes life abroad to differ from that at home.

"There seems to be a general impression that exiles like myself live a life very different from that in their own country. While I have not been very far afield, I venture to say that the mental reactions involved in the daily routine of breakfast, off to the office, telephoning, letter writing, and so on, are about the same everywhere.

"When you get used to it, it is no more strange nor surprising after a train or aeroplane journey to find one's neighbors speaking another language than to find them speaking the same one. If the food tastes differently at first, we soon find that it seems to go with the climate. Besides, home cooking is the best anywhere and a few choice recipes picked up here and there only add to the almost omniscient American cook book. If we go to the theatre, it is the absence of the prompter, or his presence as an audible member of the cast, which makes us feel at home or

not rather than the language spoken. If it is the talkies — at least you are spared a film with 'speech and titles in whatever the language may be' — on the other hand, we are increasingly likely to see and hear a model of one of next year's Hollywood productions instead of last month's or last year's.

"So with four words of this language, a smattering of that, and a fairly comprehensive understanding of another, we go cheerfully along with the assurance that whoever is listening patiently is quite likely to help us out in good English should we break down entirely. Wherever we live, even (or perhaps especially) here in England, after a few months the children start showing us how the language should be spoken, although it takes them an equally short time to forget it when we move on.

"I have taken you at your word and written a personal letter. Probably there is not much of it you can use for the class news, but I hope that you will publish the first paragraph at any rate. — With best wishes and kindest regards."

So closes this month's column with a plea for letters to maintain our enviable record of never having missed a month in *The Review*. — AZEL W. MACK, *Secretary*, 379 Marlboro Street, Boston, Mass.

1916

Your Secretary has just recently returned from a western sales trip, where he was fortunate enough to have a visit with H. W. Ellis at the General Electric Works in Cleveland. Ellis is in full charge of all production work for the various lamp divisions located in various parts of the country. This necessitates a good bit of traveling on his part. If you happen to have a G. E. Lamp Division located near you, be sure to drop him a line and urge him to call on you when he is next in your vicinity.

Had a brief visit with Hovey Freeman and Sol Makepeace in Providence early in October. Hovey seemed to have added a few pounds in the neighborhood of his waist line, but Sol still keeps his girlish figure. Both of them promised to send me a good long letter telling about the activities of our classmates in Providence, but this has not as yet been received.

It was a great pleasure to receive the following letter from Howard W. Green of Cleveland: "It seems an age since I wrote you regarding myself but a paragraph in the July issue of *The Review* prompts me to bring you up to date. As you perhaps remember, I have been Secretary of the Cleveland Health Council and in charge of statistics and research since 1925. Since taking a two months' leave of absence without pay in 1930 to act as supervisor of the Federal Census for the Sixth District of Ohio and a shorter leave in January, 1931, to supervise the unemployment census in Cleveland, one of the 19 cities in the U. S. in which the Bureau of Census carried out this special census, I have been whirling.

"I analyzed the census data for Cleveland, Lakewood, Cleveland Heights, East Cleveland, and Shaker Heights,

which was sorted and tabulated for me in Washington by the Bureau of Census, and prepared a 250-page book, 'Population Characteristics by Census Tracts, Cleveland, Ohio, 1930,' for the Cleveland *Plain Dealer*. This book gives more data for the Cleveland area than has ever been available in any city of the world. All of the census data are tabulated for each of the 252 small, geographically constant areas or census tracts. The data are of great value to those engaged in health and welfare work, but to an even greater extent for any persons involved in merchandising work. To know all about the composition and characteristics of the inhabitants of each of 252 small areas within this metropolitan community, even to buying habits, is of great value. During the past five years I have published several census tract books, but this one is the most comprehensive.

"Since the book was published I have felt that I could soon qualify as a real Chautauqua speaker, for a great many groups have demanded me as their speaker, not only in Cleveland, but in New York and other cities in the East, and I have tried to be accommodating and do them all. There are three groups, however, that I shall not have to address on the *Plain Dealer* book, as I am President of the M. I. T. Alumni Group, of the Cleveland Section of the American Society of Civil Engineers, and of the Cleveland Chapter of the American Statistical Association.

"This summer I made several trips to Washington to try to get a Federal Home Bank in Cleveland, but since Cincinnati secured the bank, we will have to be satisfied with an agency if we get one. Now I am turning all force on the promotion of slum housing in order to take advantage of the Reconstruction Finance Corporation money available for this purpose, which, as we look at it, has a twofold purpose; namely, to provide decent housing for the low-income group.

"You can see that I have been rather occupied, to say the least. I saw Gordon Fair in Montreal last fall at the American Public Health Association meeting. He was on his way back from Europe. Last July I saw Joel Connolly at Lake Geneva, Wis. Joel is with the Chicago Health Department; he looks much as he did in 1916 and tells just as many good stories as when we were out to your house five or more years ago. He had his young son with him, so he was rather busy. The baby was only six months old. I also had the pleasure of meeting Mrs. Connolly and their little girl. Last spring I ran into Rusty White in the Pennsylvania Hotel in New York. I could not see that he had changed much. I see Phil Cristal frequently. You remember Phil was at camp with us, and graduated in '17. He is one of our most important *entrepreneurs*. I attended a dance in Philadelphia last May and ran into Obie Pyle and his wife. Obie is with the Brown Instrument Company. I should have written you two years ago about my visit with Eddie Clarkson and his family while I was in Los Angeles in 1929. Eddie is taking care of the drainage

1916 Continued

of Los Angeles, but there was a drop of water around in the big rivers even when I was there. I hope it has rained since so that he will have some run-off to work with." — HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, Bemis Bro. Bag Company, Memphis, Tenn.

1917

J. Talmadge Woodruff dropped in during the month and told of his interesting work recently in the special field of regional planning. He has been Chief Planning Engineer of the Regional Planning Federation of the Philadelphia Tri-State District which prepared a plan for the 5,000 square mile area surrounding Philadelphia. He was chief of the Bureau of Planning of the Greater Pennsylvania Council, a State department concerned among other matters with the preparation of a State Parks Program for Pennsylvania. Woodruff is now located in Bridgeport, Conn., from which center he is acting in a consulting capacity on several planning projects, among which is a Plan for Fairfield County, Conn., and the city planning work at Springfield, Mass., with which he has been closely associated since 1923.

I had a few minutes with Ray Gauger in Minneapolis during October, where I find him hiding his emaciated carcass behind a not too well developed mustache. Ray has been extremely busy for various reasons, among them being the necessity of taking over the whole architectural business formerly carried on jointly with his father and, more recently, intensive political activities in the State. Incidentally, he also has a son a month or so old who has been named Raymond Gauger, Jr.

Hank Stagg, Jr., writes that he bought the Hawley Hardware Company at Bridgeport, Conn. (wholesale and retail dealers in builders' hardware, and so on) some two years ago and that as a result he has been able to divorce himself entirely from anything of a technical nature. So far as we can gather, he is happy and reasonably successful as a result of being in business for himself with additional bright prospects when business improves.

Frank Peacock has moved to Denver though what it is all about we have yet to hear. — RAYMOND S. STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

Now that the pastime of addressing Christmas cards is engaging everyone's attention, it might be well to note that Jule Avery sailed for Europe on October 15, about two weeks after Mr. and Mrs. Yale Evelev also departed thence on the *Bremen*. Yale postcarded us: "After seeing a little of America first, we have taken a notion to give the old worn-out, legend-laden countries the once over. Our itinerary calls for the English lake country, Paris, William Tell's playground, Vienna, Russia, and finally Goethe's stamping

ground, before coming home sometime in December." Jule did not favor us with details of his jaunt, so we suggest holding his Christmas card till sometime next August when a "wish you were here" message would be appropriate.

We had a head-on collision with Win Caird on Massachusetts Avenue last October, but since he was going up wind in pursuit of what sniffed like a job and since we did not wish to further ravish the record of having been late to a class but once in 13 lean academic years, there was time only for an exchange of promises, not yet fulfilled. A few days later, Allen Miller saluted us loudly by a nickname which years of careful living have failed to live down — saluted us in the sanctum of Willie Jackson's own bailiwick, the information office. An attempt to interview him in our own sanctum failed. Even the promise to exhibit the butterfly collection would not lure him thither. He was interested only in finding one of the business administration professors, explaining that he forsook biology to provide cultures in which to nourish his bug on advertising.

Good things as well as calamities apparently come in threes, for behold, the very next week as we were climbing into our Grandpa Paige out in the parking space, didn't J. H. Sullivan, Jr., come along. Inclined to be over modest, he would give us no details concerning his researches on quartz for the General Electric Company, but he did declare that he has not eloped with anybody (being happily married already), has not shot anybody (being in favor of never using force where you can use persuasion), and has not yet regretted a Technology education (being one of the few to use some of his professional subjects).

Gretchen chided us good naturedly for consigning her to the courthouse in the October notes. Far from accepting our gentle hints toward more maidenly driving, she apprised us of certain ambitions in the matter of speed records which should land her in Harlem, Heaven, or the hospital. (See this column for developments.)

The *magnus opus* of the year comes from that Niagara of fidelity, Mal Eales. Sez he under date of October 19: "First of all, many thanks for the copy of your book which I am enjoying on the train morning and night, that being about the only opportunity since the open season on screens, furnaces, and general fall knitting around the estate. Anna got quite a kick out of your inscription, and immediately rose to a point of order, stating that I not only settle my own problems but even those which may not concern me. [The book: "Problems in Human Engineering." The inscription: "To Mal Eales, who never has any problems because he settles them all." Note carefully Mal's nice use of the subjunctive *may*, a construction delicately implying something contrary to fact.]

"In the language of a famous columnist, one of our more prosperous classmates, expecting a 'blessed event,' has been dickering with another classmate,

occupation insurance counselor, to obtain insurance against twins. What odds, gents?

"Had lunch with John Cassidy and Bill Costelloe recently. John has decided to take up law and in order to kid the worthy profs along sufficiently, he appears at classes five nights a week at Fordham Law School in the Woolworth Building.

"We started the 1932 season last Monday evening with a dinner at the Rose Marie Restaurant. Had an excellent meal and sat around afterwards till nine, discussing what we hope you fellows will agree to on the reunion. The crowd included: Jack Kennard, Walter Robertson, Bill Foster, Clarence Dagnall, Tom Brosnahan, Sax Fletcher, Clarence Fuller, Karl Ford, Sidney Judson, and Ev Rowe. We sent out 40 notices and received, in addition to the above, 15 regrets due to being out of town. Ned Longley and Rus Mumford said they'd be there, but so far haven't arrived. They'll have to pay double next time.

"With regard to the reunion, Weekapaug seems to be the crowd's choice on the basis of convenience to both Boston and New York, attractiveness, size, and mainly the fact that we know what it's like because we had such a magnificent time there in 1928. It was recommended that special attention be paid to the fireworks committee this year. We are, therefore, passing the well-known buck to you now to get an expression of opinion from the Boston crowd. The fellows here suggest about June 20 for the date. As far as a stag reunion is concerned, a lot of us don't think so well of it, but we feel it should be put up to the Class for a vote. The vote will, of course, have to consider those who would go. We learned after dinner of the presence in New York of Earl Collins and Asher Joslin, both of whom we hope to get out next time. Sumner Wiley has left Voorhees, Gmelin and Walker and we've lost track of him. Karl Ford has moved to West Orange, the healthiest city in the U. S. A. Wendell Kayser has opened an office here as an industrial engineer.

"On October 8, the Kennards, of Dorchester, threw a bridge party to open the season down here and we had the usual good time in their new colonial home at Short-Hills. Dot and Clarence Fuller were there, as were Mr. and Mrs. Ned Longley, Helen and Walter Robertson, Lillian and Herb Lerner. Being a contract bridge party, the evening brought forth all that a combined course in precision measurements and business law could possibly develop. — P. S. While the above facts (?) are obtained from sources we believe to be correct, their accuracy is not guaranteed." — F. ALEXANDER MAGOUN, *Secretary*, Room 4-134, M. I. T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, Wilson Road, Rowayton, Conn.

1921

Although Election Day is just around the corner as we write these notes, our calendar pad reminds us that this is the

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last issue of The Review which will be in your hands before the holidays and that our heartiest Christmas and New Year greetings are to be extended to every member of the Class.

Chick Kurth, our Boston correspondent, reports seeing H. A. Goodman, special agent for the Equitable Life Assurance Society, who makes his home at 95 Uphams Street, Malden. Says Chick: "Harry has a daughter, Charlotte, aged 7, a good-looking automobile, and other outward appearances of a successful insurance broker. He has recently returned from the Montreal convention of his organization, attendance at which is a reward for exceeding the quota of insurance sales for the year. Incidentally, Harry has been attending these conventions for six consecutive years."

News has just reached us of the wedding of Miss Katherine Francis Burke, daughter of Mr. and Mrs. Richard J. Burke of Arlington, and Harry B. White, son of Mrs. Frederick O. White, of Arlington. The bride, a graduate of the Cambridge High and Latin School, is a member of both the Proparvulis and Aristos Clubs of Boston. The bridegroom was graduated from the Northeastern School of Law following his studies at the Institute and is now a well-known Boston attorney. Mr. and Mrs. White are making their home in Arlington.

In line with your economy program, may we suggest that you include some news with your holiday greetings and insure for your secretaries a merrier Christmas and an even happier New Year. — RAYMOND A. ST. LAURENT, Secretary, Rogers Paper Manufacturing Company, South Manchester, Conn. CAROLE A. CLARKE, Assistant Secretary, University Avenue, Chatham, N. J.

1923

A lament regarding the defection of our once thriving organization of Course Secretaries is not new as you no doubt have noted. Al Pyle, who looked after Course VI, has been the most faithful, but lest you get the impression that there has been a high degree of performance from any of them, I might mention that Al's record of late has been to supply something for about one issue a year. Al is now a married man which may make a difference. Incidentally, this department received more newspaper clippings about his engagement and marriage than for any similar event reported in this column.

Pete Pennypacker can usually be depended on for an item or two. He writes: "Announcement has been made of the marriage of Robert Valentine Burns, I, and Miss Lillian Campbell. Strange how these hold-outs will fall! The couple are living at 317 William Street, East Orange, N. J. Bob is associated with the Edison Company, located in West Orange, N. J. He is plant and organization manager or something of the sort. Last spring Bob spent a few weeks abroad, primarily for the purpose of being with his parents in Ireland. He is devoting his evenings to the study of law, having embarked on a three years' evening course."

I got the following from Lowell L. Holmes, XV, in response to a recent inquiry, who, in explaining why he hadn't written before, had the following to say: "You see my Tech experience was so much different than the 'mine run.' It was not my first college; I was 30 when I graduated; I had a family; all of these and many other facts kept me from getting as well acquainted with the boys as I should have liked to. Of course, some of the boys may remember the 'old man' who helped out at the 'co-op' and if they want to know about me and mine I shall be glad to help you fill the space."

"Let's see. It will be 10 years next June. I have spent the time at four jobs in as many states. A year at Boston, a year at Pittsburgh, a year in Minneapolis, and six years at Akron as a college professor. From bad to worse, and then taking a year off to finish my Ph.D. at the University of Chicago. That will sum up the ten years. I'm not sure that the faculty of this great university will grant the Doctor of Philosophy degree, but even if they do I shall not prize it as high as that S.B. in Engineering Administration."

"Just to give you my feeling of the 'old man' writing back to his comrades of ten years ago, I'll tell you what my oldest boy (a sophomore in High) said to me yesterday. 'Say, Dad, you're getting smaller every year. I used to think that you were a big man. Somehow you're not so big.' So you have the low-down on everything. As far as I am concerned I cannot learn as much as I need to know, because the more I learn the less I know. Of course, I am not specializing as narrowly as you would think. Just trying to know Economics, Management, Organization, and Life Insurance. It is as big a task as I will want for my next 50 years." — HORATIO L. BOND, Secretary, 195 Elm Street, Braintree, Mass. JAMES A. PENNYPACKER, Assistant Secretary, Room 661, 11 Broadway, New York, N. Y.

1924

Eight years out and I think this old class must be all settled down for good. I notice that news items are getting scarcer but perhaps the best evidence that they are settled is in the fact that since our last appearance I have news of only two marriages. And in our heyday we had no less than three a month! The first wedding referred to is that in Rio de Janeiro, Brazil, between Miss Margaret Clewell and Douglas Montgomery. Mrs. Montgomery was graduated from the New York University School of Education, Class of 1931, and is the daughter of the Reverend and Mrs. R. E. Clewell of Elizabeth, N. J.

Of himself Montgomery says: "Since last year, I have been transferred from Argentina to Brazil. I am still in the Export Department of Electrical Research Products, Inc. My title here is chief engineer for Brazil. Our headquarters are in Sao Paulo, but I am here in Rio for some time." Address: Western Electric Company of Brazil, Rio de Janeiro, Brazil, Rua Senador Dantas, 13.

The second wedding referred to is that of Miss Louise E. Heaphy of Beverly, Mass., to Charles E. Riva, also of Beverly, on June 16. Mrs. Riva studied at the Boston Conservatory of Music and has been Secretary of the Beverly branch of the American Red Cross. Riva is now a construction superintendent for James J. Coughlin Company, contractors, of Boston. They are living at 235 Audubon Road, Boston.

On Tuesday, October 4, the New York gang got steamed up and opened their season with a luncheon at the Planters Restaurant at 128 Pearl Street. Those luncheons are now an old established custom, ably guided by A. R. Gruehr. At 4 Irving Place he is open for new additions, my understanding being that there are no subtractions.

M. F. Freeman has joined with two other M. I. T. men, E. H. Cameron '13 and Arthur L. Nelson '15, to form in Boston a new firm under the name of Arthur L. Nelson, Engineers. — Dr. W. Kupferburger, who took advanced work with our class, has just been appointed assistant director of the Geological Survey of South Africa, located at Bloemfontein. From Dick Shea I learn that the Institute of Radio Engineers last spring awarded the Morris Liebmann Memorial Prize to Edmond Bruce for his theoretical investigations and field developments in the domain of directional antennas. Bruce is with the Bell Telephone Laboratories and is reported as having done some very exceptional work concerning specialized receiving developments.

I have received notices of the deaths of Gordon Wayne of Wollaston, Mass., and Joseph Dalton, of Charlottetown, Canada. To their families we extend our most sincere sympathy. — HAROLD G. DONOVAN, General Secretary, 372 West Preston Street, Hartford, Conn.

1926

A new gold rush is on in northern Ontario and, of course, 1926 is participating in any search for the yellow metal. William B. Millard, together with friends from New York, made one of the early gold strikes in the Swayze field. An interesting account of the experiences of some of the prospectors in that field was printed in the New York Times of October 30. The story tells how Millard and some of his colleagues were perilously near starvation when they became lost from their comrades. Only by a little ingenious engineering work on a forester's telephone line were they able to get in touch with their party. The Secretary hopes to have an account from Millard when he flies out of this almost inaccessible region.

Allen Orth is co-author with Charles F. Kettering, Vice-President of the General Motors Corporation, of a new book entitled "The New Necessity." Orth is a G. M. engineer and has a gift for technical exposition. The new book concerns, of course, the automobile.

F. P. Ward is running, and is, an advertising service in Hartford, Conn. — Fred C. Balfe, Jr. is, to quote from his letter,

1926 Continued

"with one of the two banks in New York State which, in spite of the depression, continue to pay interest to their depositors at the rate of $4\frac{1}{2}\%$." His address is 268 Grand Street, Newburgh. — Miss Elizabeth Bradley of Rockport, Mass., was married to Edwin W. Southworth on September 24. — Dick Rothchild is now residing in Macon, Ga., and writes that he has not seen a Technology man in five years. Dick, it will be remembered, was co-author of the 1926 Tech Show, "Too Many Brothers." — Miss Lillian M. Broderick was married to William Francis Rooney on October 25, in Dorchester. — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

COURSE VI-A

There isn't a great deal of news, nor are there many new faces to present this time. In fact, most of the members of our group seem to feel that "no news is good news." Let's hope it has been to date but that from now on more fellows break into print in these columns.

Another visit to Philadelphia since the last contribution was sent in brought forth the fact that Jim Crawford's chest has expanded a few inches and his nights are occasionally disturbed. Cause: a daughter. While my personal congratulations were extended earlier, I take pleasure, Jim, in officially extending the congratulations of your classmates at this time.

Last summer, while breezing through New Haven at about 7:30 p.m., it occurred to me that Nat Gada was last heard of in that locality. So I stumbled out of the car to a telephone booth and found his home listed under the G's; but found that he had not returned from his labors as yet that evening. I was informed he had to make trips to neighboring communities in an effort to promote good outdoor lighting. From which we gather Nat is still with G. E. and plugging hard. A male voice answering my call led me to guess that Nat is still a bachelor and has at least one mate to play rummy with in the evenings. How about it, Nat? Let's hear your story from a reliable source (not necessarily meaning I'm a liar). — BENJAMIN P. RICHARDSON, *Secretary*, Box 384, Congers, N. Y.

1928

COURSE I

I have just returned to New York from the wilds of Wisconsin, and the change inspires these few notes.

Again we extend congratulations. This time to Jack Luby, who was married on September 10 to Miss Anna Rose Riley. The wedding took place in Hyde Park, Mass. While en route to New York last week, I tried to get in touch with Jack in St. Paul but learned that his work with the U. S. Engineers had shifted him to LaCrosse, Wis., and he is living at 2021 Madison Avenue in that city.

From Rice I learn that my story to the effect that Schwartz was in Kentucky is, to say the least, mythical. He assures me

that Herm is at 97 Dalby Street, Newton, Mass. — Ed Ure has moved a few blocks to 544 West 163d Street, New York City. He met Bion Moore some weeks ago and learned that Moore got his M.S. in Transportation from Yale last June.

I passed through Glen Ferris, W. Va., on my way home last summer and tried unsuccessfully to locate Bill Tandy. I learned, however, that Bill was there, still engaged on the large hydro plant being built by the Union Carbide Company.

Art Josephs is still in Europe with headquarters in Vienna, whence he sallies forth on trips to Italy, Switzerland, and elsewhere, spending his time very successfully. — GEORGE P. PALO, *Secretary*, 426 East 238th Street, New York, N. Y.

1929

This fall is our fourth as Alumni and in looking over the news of our Class, it is surprising how few of us have written in telling about ourselves. Already this year, I have missed two issues of The Review waiting for something in the line of news from the course secretaries at least. So far, the only news forthcoming from any source has come from the news clipping agencies relative to engagements and marriages. The Class extends congratulations and good wishes to those couples about whom the following announcements have been made.

Link Reid's, I, engagement to Miss Shirley A. Allen of Castine, Maine, was announced in May. Miss Allen is the daughter of Mr. and Mrs. George I. Allen and they formerly lived in Link's home town, Peabody, Mass. — Archibald W. Adkins', I, engagement to Miss Dorothea Cheney, daughter of Mr. and Mrs. Nathan Cheney of Belmont, was announced early in August. He is now in the Bureau of Reclamation in Denver.

Adrian Clark, XV, is another of the bachelors of the Class to become engaged. Early in June his engagement to Miss Hope James, daughter of Mr. and Mrs. Harry G. James of Central Falls, R. I., was announced. — The engagement of Ben Proctor, XV₂, to Miss Laura Gregg, daughter of Mr. and Mrs. Louis D. Gregg of Hackensack, N. J., was announced early in May. — From Malden comes the news of the engagement of John Lucey, XVII, to Miss Margaret Doyle of that city. — Arthur Scott's, X, engagement to Miss Maxine Damren, daughter of Mr. and Mrs. Kenneth H. Damren of Melrose, was announced in June. Scotty is now living in New York City. — The engagement of Blizard Snow, XV, to Miss Edith Carter of Chicopee, Mass., has just gotten to me. He joined the ranks of the engaged last December. At that time he was located in Rockland, Maine.

The marriage of Bill Hutchinson, III, to Miss Katherine Farlow, daughter of Mrs. Maude Soule Farlow, was announced early in July. Bill is now working in Pottsville, Pa. They will live in Trucksville, Pa. — Chester Rankin, VI-C, was married July 30 to Miss Helen Backus, daughter of Mr. and Mrs. Charles

N. Backus of Brooklyn, N. Y. — In June the marriage of George Walker, III, to Miss Helen Griffith of Santa Barbara, Chihuahua, Mexico, was announced. George first went to Santa Barbara after graduation and was later transferred to another Mexican unit of the American Smelting and Refining Company.

Judging from the volume of the preceding announcements, the ranks of the benedicts are being rapidly augmented in spite of the depression. Again we extend our best wishes for great happiness to them.

Another Course III man breaks into the news as follows: Charles A. Whitney reported to Colonel Locke that for the past few months he has been a rather unsuccessful operator of a gold mine in Arizona and that he has also done considerable prospecting work in that state. The mine which he operated with two other fellows was a small underground placer gold mine about 30 miles from Prescott, Ariz. They worked it from April until July and found it very interesting and instructive, but not remunerative. Their main difficulty was a gradually diminishing water supply which eventually disappeared entirely. During the last week or ten days a little humor entered the story in that the water would flow one hour earlier each day, that is, 6:00 A.M. Monday, 5:00 A.M. Tuesday, and so on, until 3:00 A.M. was reached. The latter was the limit. Now he is back home again in Tulsa, Okla., waiting for anything to turn up.

Frank Stratton, VII, played the piano at the fourth Candle Light Concert at Byfield, Mass. Frank left the Eastman Kodak Company last year and has been studying at the Rochester Conservatory since to develop still further his talent at the piano. As you all remember, Frank rated considerable attention from the critics while playing for the Glee Club at the Institute.

During the summer Ralph Atkinson, IX-A, and his wife stopped over in Akron with me on their way through to her home in Missouri. Like all other Akron visitors, they showed considerable interest in the construction of the *Macon* at the Goodyear Zeppelin Dock. The *Macon* is the sister ship of the *Akron*. Both of the ships were built by Goodyear for the navy and the *Macon*, although first planned to be the same size as the *Akron*, will be slightly larger. It will also incorporate some improvements that have been developed as the result of experience gained in the construction of the *Akron*.

Concerning myself, I can only add that nothing exciting has happened during the summer to speak of, excepting possibly my golf game is still improving. Now, there's a game that should form a fine basis of common interest. Let's have some letters in about your game and your scores. You'll probably accuse me of boasting when I post a couple of 73's for myself on a tough private course — Fairlawn, to be exact, here in Akron. Well, if you only accuse me of boasting, it will not be so bad, but please — not a fabri-

1929 Continued

cator. In fact, one of those 73's was scored in a match for the club championship in which I took my opponent over to the tune of seven and six. — EARL W. GLEN, *General Secretary*, Box 178, Fairlawn, Ohio.

1930

COURSE VI-A

Having made a slight tour of the country, I now have some first-hand information concerning the activities of a few of our classmates. My first visit was at Frank Burley's in West Collingswood, N. J. Frank is still going strong as a student engineer for R. C. A. Victor, having just completed a very interesting assignment as a quality control man in the factory. During my stay, Frank tried to demonstrate on a rowing machine which he had just bought how he used to row on the 150-pound varsity crew for M. I. T., with yours truly in the capacity of coxswain and a select audience consisting of his wife, Wanny, and two other student engineers. Frank was just about to finish the imaginary race with a five-length lead, when the rowing machine snapped under the strain. I'm happy to report that there were no casualties.

Wanny (William Hane Wannamaker to you) is having a responsible session at R. C. A. Victor at present in his work on standards of inductance, capacitance, resistance, frequency, and so on. For his more irresponsible diversions, Wanny is finding that he has a soft spot in his heart for a girl living not far from Camden, N. J.

I spent a very pleasant week-end not long ago at George Schaible's in Albany, N. Y. As part of his training course with the New York Telephone Company, George was taking charge of the routine testing and trouble-shooting for one of the offices in Albany. He took me through the office and gave me a very comprehensive explanation of the method by which a call goes through a step-by-step dial office. When I left George, he and his wife were looking forward with much anticipation to the celebration of their first wedding anniversary the next day.

I have received a letter from Leonard Wechsler. Wex is busily engaged in his home town, Chicago, flooding the country with that very useful product, cellophane. He tells me that he has seen very little of Erny Reisner and doesn't know in what part of the country Erny has finally located. Has anyone else been in touch with this wandering boy?

Steve Prendergast tells me that he has a new job at the Kearney works of the Western Electric Company as a male private secretary. He says that it will provide a wonderful opportunity to secure some valuable experience and a vast store of information and he has my congratulations.

I am at present sleuthing around trying to locate Bill Griffith and his wife. I'm fairly sure that they are still in the U. S. so it shouldn't be such a hard job. — May next year bring more news, and good news. — EARL E. FERGUSON, *Secretary*, 60 Eaton Place, East Orange, N. J.

1931

Greetings! Winter and cold weather approach and I hope the combination will keep the boys at home long enough to drop us a line, preferably one with a little news on the end of it.

Nelson Haskell, that old Harvard Business Schooler, accosted me in the Dudley Street car — it still is *the* street car, incidentally — and requested a list of Course I men. Possibly he is going to do some news hunting — but if any of you owe him any money, don't say I didn't warn you. Nelson seems happy even if he is at Harvard.

Harry Smith descended his beaming countenance upon us recently and — shame on him — he was on a paid vacation. He is at Sears Roebuck's Roseland Store in Chicago — Roseland sounds more like a gigolo service station than a merchandising outfit, but Harry says no — and who am I to confute him?

Bob Wilson, that old researcher, is at it again (researching) — at present in the vicinity of Milwaukee. Bob is staying in that vicinity until they start making beer again. — Harry Smith also tells us that B. T. Stott is with Sears' store in Sioux City, Iowa.

Heard that Otto Kohler was trying to get into a girls' college. My first impulse was to say, "Aren't we all?" but Otto actually means to do some work. Just which of our fair collegians will be so singularly blessed I don't know — Otto will need no assistants I'm sure.

John Harrison has been doing some questionnaire analysis work for Lever Brothers, possibly on the use of soft soap, which brings us reminiscences of undergraduate days at the Institute.

Irwin Lord has been made Assistant District Manager of the Grinnel Company in their Metropolitan District, Boston. We hope that Irwin's managerial reign is a long and pleasant one.

Arnold Childs informs me that our bachelor ranks have again been diminished. This time Al Vorce is the diminisher. Ah happy state — well we can't all be lucky! Good luck, Al.

Stu Knapp has found that business is a puzzle — in fact, a series of puzzles — for he is selling them. If any of you have any problems, see Stu. He knows the answers as well as the questions, probably better.

Met Bill Hallahan recently and Bill was right peeved about the political situation as applied to a particular building contract in which he and brother Jack are interested. I suggested that Bill enter politics and remedy the situation, but he says that he is too honest. Bill thinks he had better take up squash this fall in order to learn how to handle rackets.

John Scheuren is laying the road to success — between Framingham and Boston. John had a day off recently because of the rain. He had a day off for the same reason last spring and thinks he will go to California, where the work is steadier.

Ben Steverman and Tom Regan, '32, are thinking of going into business for themselves — selling a new product, but

not brushes. They say that the market is full o' brushes now. The boys will give old man depression a run for his money, even if it's only in his wife's stockings.

Along with Jimmy Walker, New York has lost another of its favorite sons, a more worthy one though. Rochester's gain is the big city's loss as Gil Roddy goes to Chase, Harris, Forbes' Rochester office — an advance for Gil, but then he was always quick at making advances.

Till a new year rolls around — good luck! — JOHN M. MACBRAYNE, JR., *General Secretary*, Room 1-181, M. I. T., Cambridge, Mass.

1932

I wish to urge once more that everyone take upon himself the job of writing to his Course Secretary. This will prove to be a very efficient way of keeping the Class together. An interesting example in this issue is the letter that John Crowther wrote to Bill Kirkpatrick.

A memorandum from C. E. Locke's office states that H. D. Chase has received an appointment as an instructor in the Civil Engineering Department of the University of Maine, where he will teach geology and surveying.

I wish to announce at this time that Herbert M. Wagner, 1137 Commonwealth Avenue, Allston, Mass., will have charge of the notes for Course VI and will appreciate the coöperation of the members of that course. — CLARENCE M. CHASE, JR., *General Secretary*, Chase D 33, Soldiers Field, Boston, Mass.

COURSE VII

Paul Mover is studying chemistry at Harvard University. — Harry W. Cummings is studying for a master's degree at Harvard. — Henry T. Smith is doing practice teaching at the Braintree High School and studying part time at Boston University for a master's degree in education. — HENRY T. SMITH, *Secretary*, 77 School St., Braintree, Mass.

COURSE X

John Crowther crashed through and wrote me some news so you are spared for this month from my plea for you to write me and not show signs of false modesty. Here is what John had to say.

"Dub Rash is in St. Louis with Lambert Pharmaceutical Company, teaching the great American public to gargle. He is in a non-technical branch, however, the low-life — just a course XV man after all. Potts Chambers dropped a gas-sampling tube into a fan in a blast-furnace main and caused a shutdown of the furnace. That was at the Buffalo practice school station. He and Anderson have succeeded in screwing the works several times since, I hear. With the help of God and a long-handled tooth-brush, I succeeded in getting out of the army of the unemployed about a month ago (September). I am way out here in the sticks in the northern part of Wisconsin, working, of all places, in a paper mill. The soul-less corporation which employs me is the Marathon Paper Mills Company, Rothschild, Wis."

1932 Continued

Willem Holst, Jr., has been employed by the Standard Oil Company of New Jersey. At the present time he is following a six-months' training course at the Bayway refinery, at the end of which he is to be sent to Palembang, Sumatra, in the Dutch East Indies.

William Kirkpatrick is working for the S. D. Warren Company in Westbrook, Maine. — WILLIAM KIRKPATRICK, Secretary, 35 Orchard Street, Portland, Maine.

COURSE XV

Like all struggling corresponding secretaries, this member of that sect welcomes letters from the wandering brethren, and this past week (goodie, goodie) jolly Hubert Liftenhapher, a postman of sorts, Oshkosh, Wis., brought me a rather inclusive batch of news from the

hand of Bob Phemister, pastmaster of Engineering Administration, erstwhile ranting S.A.E., and for the nonce a (shall we say?) minor executive for the Shell Petroleum Corporation, St. Louis, Mo.

Bob confesses that his career has thus far been centered around yawning gasoline tanks, and that he is taking up voice culture so that he may properly inflect, "Shall I look at the oil, sir?" Bob is gathering a few precious drams of experience, however, and trusts that his hands will not become too oily to grasp the rungs of the proverbial ladder of opportunity (also proverbial, these days!).

"Willis M. Moore, Jr., known to his friends as 'Dinty'," adds my correspondent, "is, or should be, working for the Brooklyn Union Gas Company. . . . Sonny Scharnburg is working with an investment house in New York. . . .

Serrallack told me in August that he was going back to Spain as soon as he finished his thesis. God knows when that will be."

I cannot resist the temptation to bring to notice that Elliot L. Whitaker announced in his Course IV notes last issue that he plans "to sail early in the fall to *travel and study* in Europe next year on my traveling Fellowship." Hooray for Lucky Strike and the magic carpet! Oh well, oh well. (The italics are mine, or rather, borrowed from the Rumford Press.)

But I am not here to discriminate, I am here to dole, and unhappily, the dole is over. Thanks to Bob Phemister, degrees noted above, I have been able to present a meager dose of news. Beyond lies the dim horizon and the January Review. — ADDISON S. ELLIS, Secretary, 83 Washington Boulevard, Oshkosh, Wis.

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M. I. T., Cambridge, Mass.

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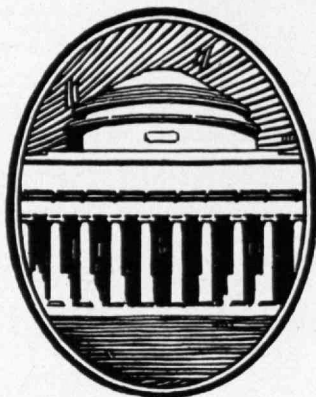
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E: For the reports of the President and of the Treasurer, ask for Bulletin E.

Y: For a popularly written explanation of Engineering Courses, ask for Bulletin Y.

All inquiries sent to the address below will receive prompt attention

THE TECHNOLOGY REVIEW BUREAU

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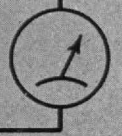
TYPE 213
400-CYCLE
OSCILLATOR

TYPE 530
BAND
PASS
FILTER

AMPLIFIER
UNDER
TEST

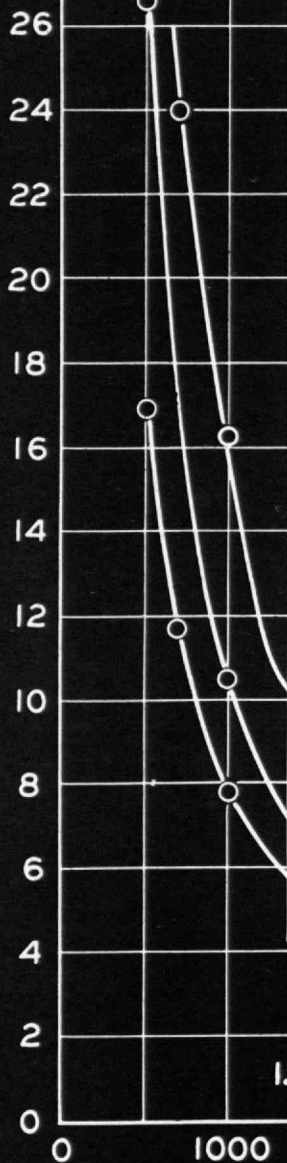
TYPE 536A
DISTORTION
FACTOR
METER

TYPE 514A
AMPLIFIER



SQUARE LAW
GALVANOMETER

DISTORTION FACTOR - PER CENT

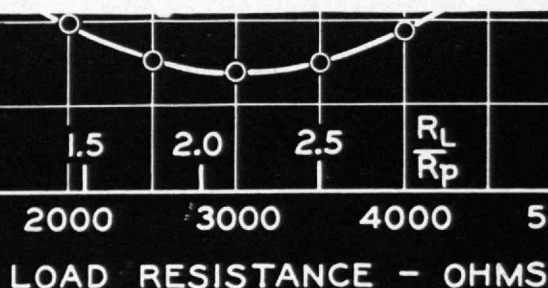


Measure amplifier distortion with this simple equipment

HARMONIC distortion in amplifiers and other high quality audio circuit elements is readily measured with high accuracy with the simple apparatus indicated by the schematic diagram at the top of the page. The method is straightforward and requires no calculations of any kind.

The distortion-factor meter is the basic element in the system. It contains a high-quality filter and a means for reading directly the total harmonic content as a fraction of the fundamental amplitude. The square-law galvanometer is a special oxide-rectifier instrument designed to have a square-law characteristic.

Principal users of this apparatus are the designers of quality radio receivers and broadcast engineers who depend on measurement rather than guess-work to maintain a high-quality signal. Receiver engineers use it to design their audio amplifiers; broadcast engineers use it to check the operation of their audio equipment as a part of their routine maintenance schedule.



The price of the complete equipment is \$325.50. Write for descriptive literature and details of its application to your distortion-measuring problems. Address General Radio Company, Cambridge, Massachusetts.

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